AMERICA'S LARGEST TEXTILE MONTHLY

COTTON

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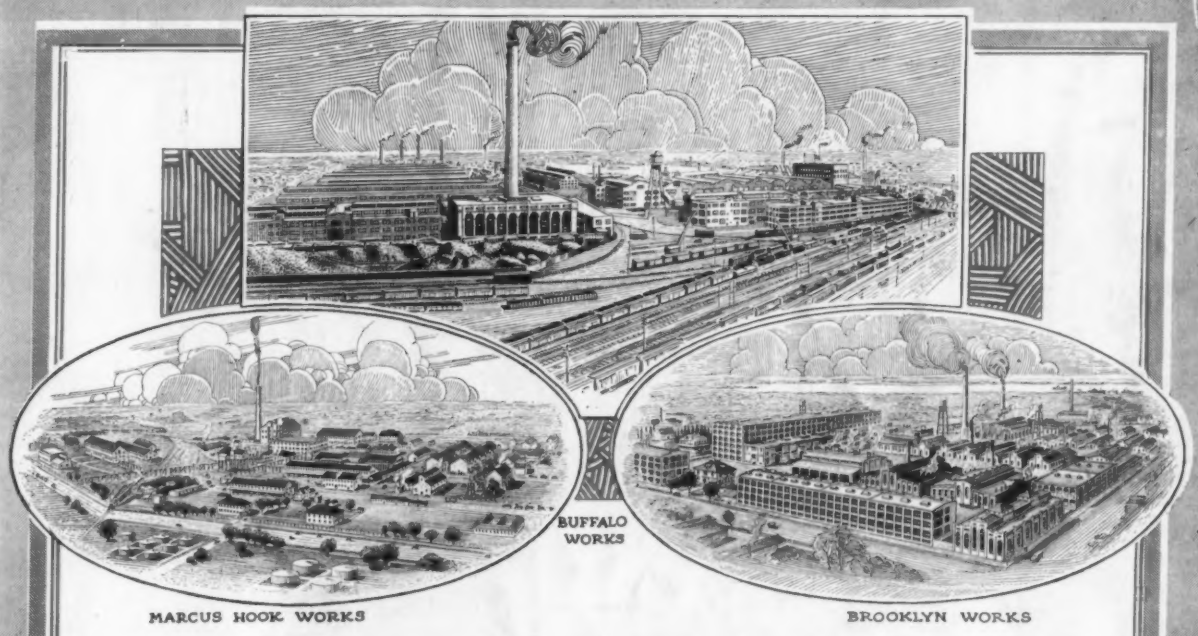


MARCUS HOOK WORKS

BROOKLYN WORKS

"NATIONAL" INDIGO 20% PASTE

SOUTHERN Textile Mills will be interested in the announcement that we are prepared to make deliveries of "NATIONAL" 20% INDIGO PASTE from our Charlotte Branch.

¶ With indigo specialists and modern laboratory facilities, we are equipped to render technical assistance to those who may need such co-operation.

¶ Careful, painstaking effort on the part of trained, technical men, together with large and well equipped manufacturing plants, go far to explain the high standard of "NATIONAL" QUALITY.

National Aniline and Chemical Co., Inc.

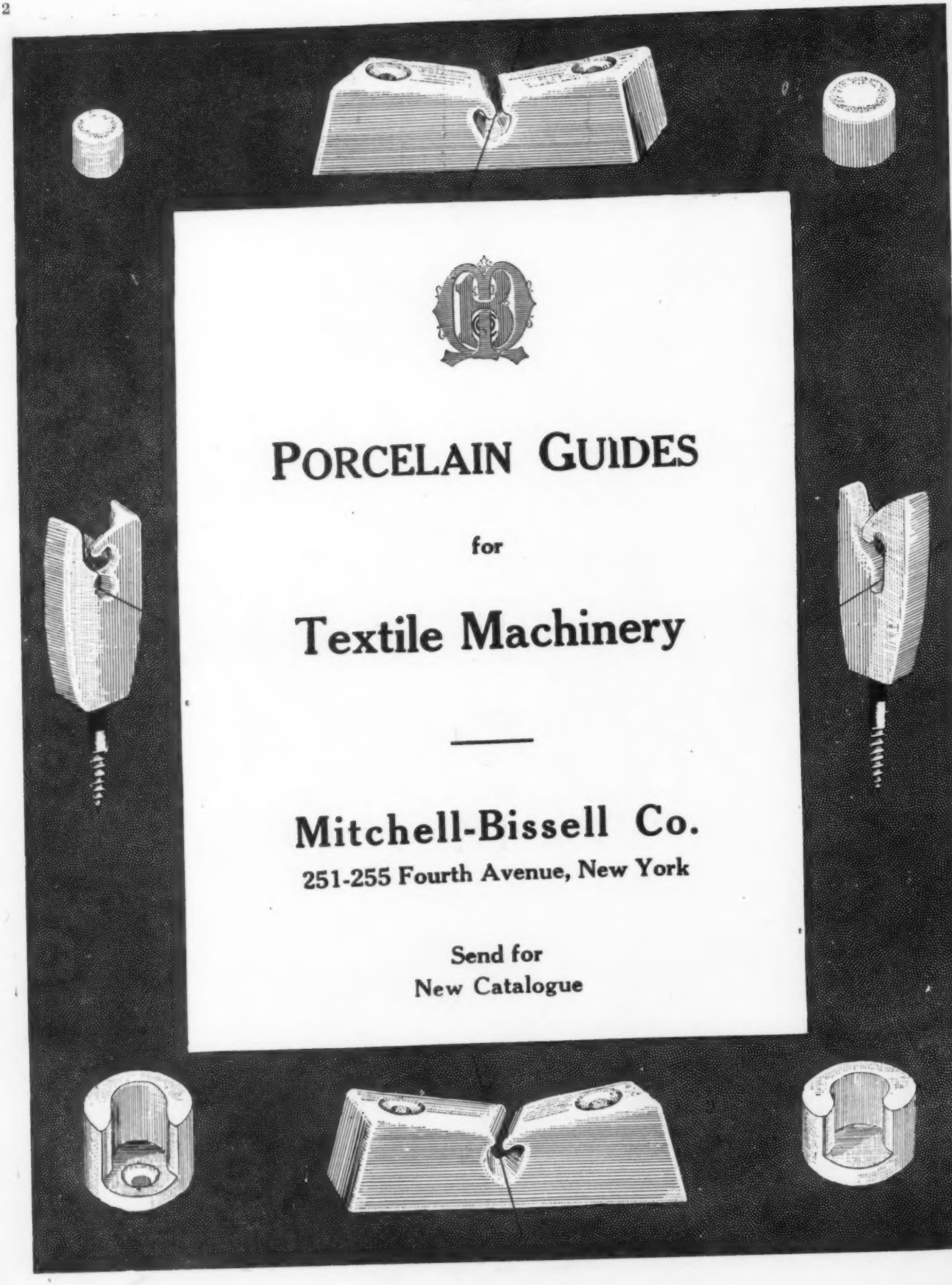
General Offices

21 Burling Slip **New York**

Southern Office
236 West First Street, Charlotte, N. C.

NATIONAL U.S.A. DYES

Table of Contents page 49. Advertisers' Index, page 296. Buyers' Index, page 294.



PORCELAIN GUIDES

for

Textile Machinery

Mitchell-Bissell Co.

251-255 Fourth Avenue, New York

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A Northrop Loom Mill Calls for less Weavers

Less Weavers Need Less Tenements

Northrop Loom Mills Help Solve the Housing Problem

DRAPER CORPORATION

HOPEDALE MASSACHUSETTS

ATLANTA GEORGIA

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Hyatt Roller Bearing Hangers save power, oil and maintenance—they transmit maximum power at minimum cost Roller Bearing Hangers save power, oil and maintenance—they transmit maximum power at minimum cost Hyatt Bearing Hangers save power, oil and maintenance—they transmit maximum power at minimum cost Hyatt Roller Hangers save power, oil and maintenance—they transmit maximum power at minimum cost Hyatt Roller Bearing save power, oil and maintenance—they transmit maximum power at minimum cost Hyatt Roller Bearing Hangers power, oil and maintenance—they transmit maximum power at minimum cost Hyatt Roller Bearing Hangers save oil and maintenance—they transmit maximum power at minimum cost Hyatt Roller Bearing Hangers save power, and maintenance—they transmit maximum power at minimum cost Hyatt Roller Bearing Hangers save power, oil maintenance—they transmit maximum power at minimum cost Hyatt Roller Bearing Hangers save power, oil and they transmit maximum power at minimum cost Hyatt Roller Bearing Hangers save power, oil and maintenance—transmit maximum power at minimum cost Hyatt Roller Bearing Hangers save power, oil and maintenance—they maximum power at minimum cost Hyatt Roller Bearing Hangers save power, oil and maintenance—they transmit power at minim... 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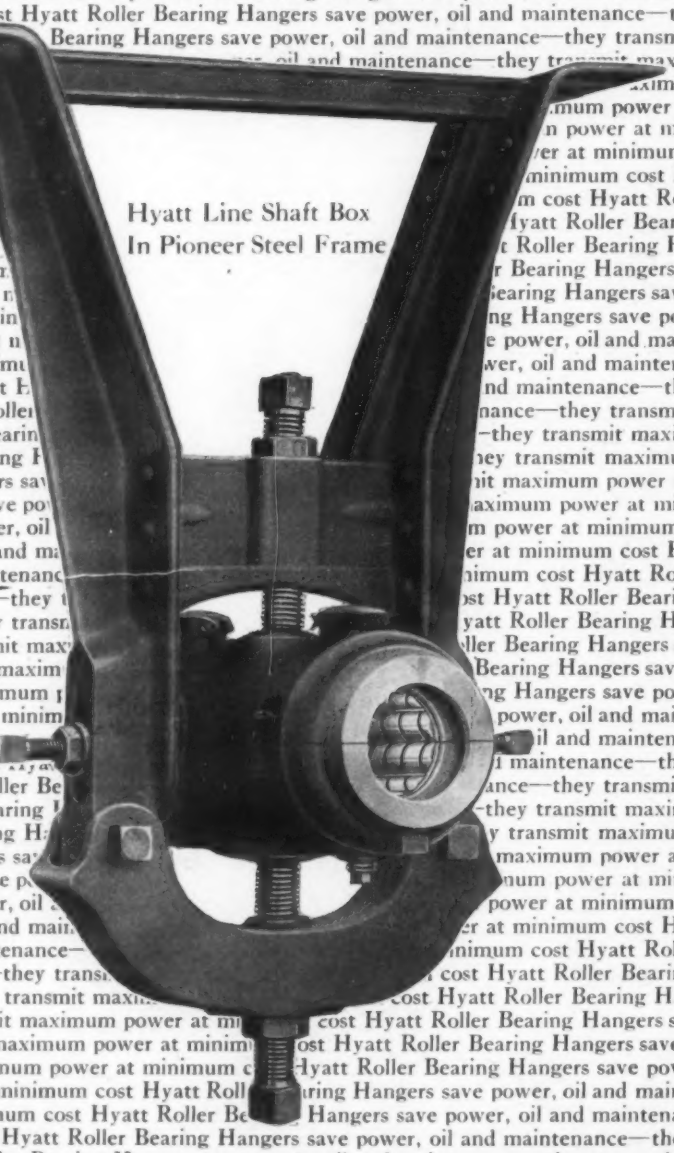

Hyatt Line Shaft Box
In Pioneer Steel Frame

Hyatt Roller Bearing Hangers save power, oil and maintenance—they transmit maximum power at minimum cost Roller Bearing Hangers save power, oil and maintenance—they transmit maximum power at minimum cost Hyatt Bearing Hangers save power, oil and maintenance—they transmit maximum power at minimum cost Hyatt Roller Hangers save power, oil and maintenance—they transmit maximum power at minimum cost Hyatt Roller Bearing save power, oil and maintenance—they transmit maximum power at minimum cost Hyatt Roller Bearing Hangers power, oil and maintenance—they transmit maximum power at minimum cost Hyatt Roller Bearing Hangers save oil and maintenance—they transmit maximum power at minimum cost Hyatt Roller Bearing Hangers save power, and maintenance—they transmit maximum power at minimum cost Hyatt Roller Bearing Hangers save power, oil maintenance—they transmit maximum power at minimum cost Hyatt Roller Bearing Hangers save power, oil and they transmit maximum power at minimum cost Hyatt Roller Bearing Hangers save power, oil and maintenance—

THERE never was a time when saving power, oil, and maintenance costs was more important than today. The reduction of 15% in power, 80% in oil, and 100% in maintenance for your line shafts is worth your very serious attention. Hyatt Roller Bearing Hangers are split which makes them easy to put on the shaft, and once on you can forget them for twenty or thirty years except to oil them four times a year.

Hyatt Roller Bearing Company
New York, N. Y.

cost Hyatt Roller Bearing Hangers save power, oil and maintenance—they transmit maximum power at minimum Hyatt Roller Bearing Hangers save power, oil and maintenance—they transmit maximum power at minimum cost Roller Bearing Hangers save power, oil and maintenance—they transmit maximum power at minimum cost Hyatt Bearing Hangers save power, oil and maintenance—they transmit maximum power at minimum cost Hyatt Roller Hangers save power, oil and maintenance—they transmit maximum power at minimum cost Hyatt Roller Bearing save power, oil and maintenance—they transmit maximum power at minimum cost Hyatt Roller Bearing Hangers power, oil and maintenance—they transmit maximum power at minimum cost Hyatt Roller Bearing Hangers save oil and maintenance—they transmit maximum power at minimum cost Hyatt Roller Bearing Hangers save power, and maintenance—they transmit maximum power at minimum cost Hyatt Roller Bearing Hangers save power, oil maintenance—they transmit maximum power at minimum cost Hyatt Roller Bearing Hangers save power, oil and they transmit maximum power at minimum cost Hyatt Roller Bearing Hangers save power, oil and maintenance—transmit maximum power at minimum cost Hyatt Roller Bearing Hangers save power, oil and maintenance—they maximum power at minimum cost Hyatt Roller Bearing Hangers save power, oil and maintenance—they transmit power at minimum cost Hyatt Roller Bearing Hangers save power, oil and maintenance—they transmit maximum at minimum cost Hyatt Roller Bearing Hangers save power, oil and maintenance—they transmit maximum power minimum cost Hyatt Roller Bearing Hangers save power, oil and maintenance—they transmit maximum power at cost Hyatt Roller Bearing Hangers save power, oil and maintenance—they transmit maximum power at minimum Hyatt Roller Bearing Hangers save power, oil and maintenance—they transmit maximum power at minimum cost Roller Bearing Hangers save power, oil and maintenance—they transmit maximum power at minimum cost Hyatt Bearing Hangers save power, oil and maintenance—they transmit maximum power at minimum cost Hyatt Roller Hangers save power, oil and maintenance—they transmit maximum power at minimum cost Hyatt Roller Bearing save power, oil and maintenance—they transmit maximum power at minimum cost Hyatt Roller Bearing Hangers power, oil and maintenance—they transmit maximum power at minimum cost Hyatt Roller Bearing Hangers save

Are You Getting Back to Earth?
The very best of wages, working conditions, hours of labor, and everything else, will not maintain peak-production unless your working people *think right*. This has been proven to your complete satisfaction these past two or three years.
Why not get back to earth? *Why not use old-time common sense?* The *old-time employer* rubbed elbows with his helpers—you can't, there's too much for you to do elsewhere. He was known by and knew every fellow around him. He kept them with him by word of mouth and personal contact. There was little trouble those days.
Think it over. Didn't he succeed because of personal contact and suggestion? His workers rubbed elbows with him and knew he was on the square—no radical started something; *no knocker* made any headway in his mill.
Through rubbing elbows, by word of mouth, through personal contact, we are invisibly opening the eyes and ears of employees throughout all kinds of industries and telling them the truth. We reach them, place the proper thought in the right place and at the right time.
The workers in the Shermanized mill know which side of their bread the butter is on—they know that a good day's work will bring a good wage—they are made to think right, to act right, to co-operate. They know that their loss is on the square—they know what to do. They fully realize that it is what a worker does in work well done that brings about prosperity.
We'll tell you Who we are, What we do, and How we do it, either through the mail or by rubbing elbows with you.
Write our nearest office on your business letterhead for our literature, or, better still, tell us when we can have a conference.
SHERMAN SERVICE INC.
Production Engineering
Industrial Co-ordination
New York 2 Rector St.
Chicago 208 So. La Salle
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St. Louis 314 No. Broadway
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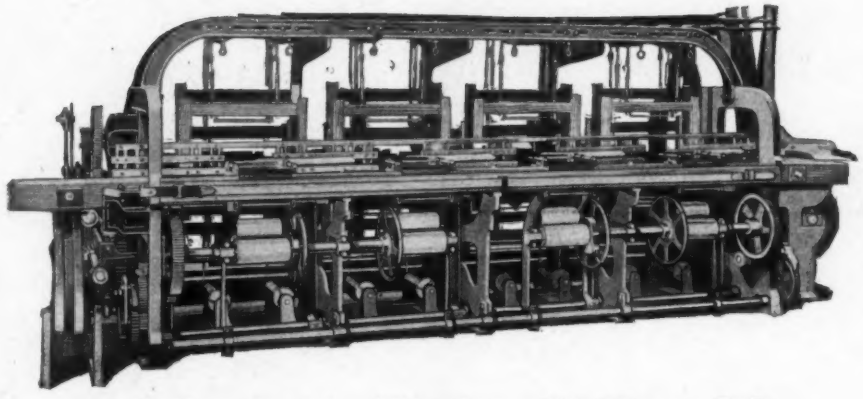
Pittsburgh 401 Wood St.
Kansas City Reliance Bldg.
Montreal Drummond Bldg.
Largest organization of its kind in the world.
Founded April 7, 1910.
SHERMAN SERVICE

FLETCHER
HEAVY WEBBING LOOMS



are the Standard for Weaving solid Woven Belts.

Never was the time more opportune to survey your weaving machinery equipment and tune is up for high pitch production at the lowest possible cost.

The time for economical production is here. There is no machinery investment you can make which yields so great a return—dollar for dollar—as FLETCHER WORKS (Schaum & Uhlinger) Looms.

These looms are of rigid construction
Are compact and easily operated
Are reliable under all conditions
Are finished with the time, material and labor saving devices for which this house has been noted since 1850.

Our engineers are at your call to help you in a survey of your plant.

FLETCHER WORKS

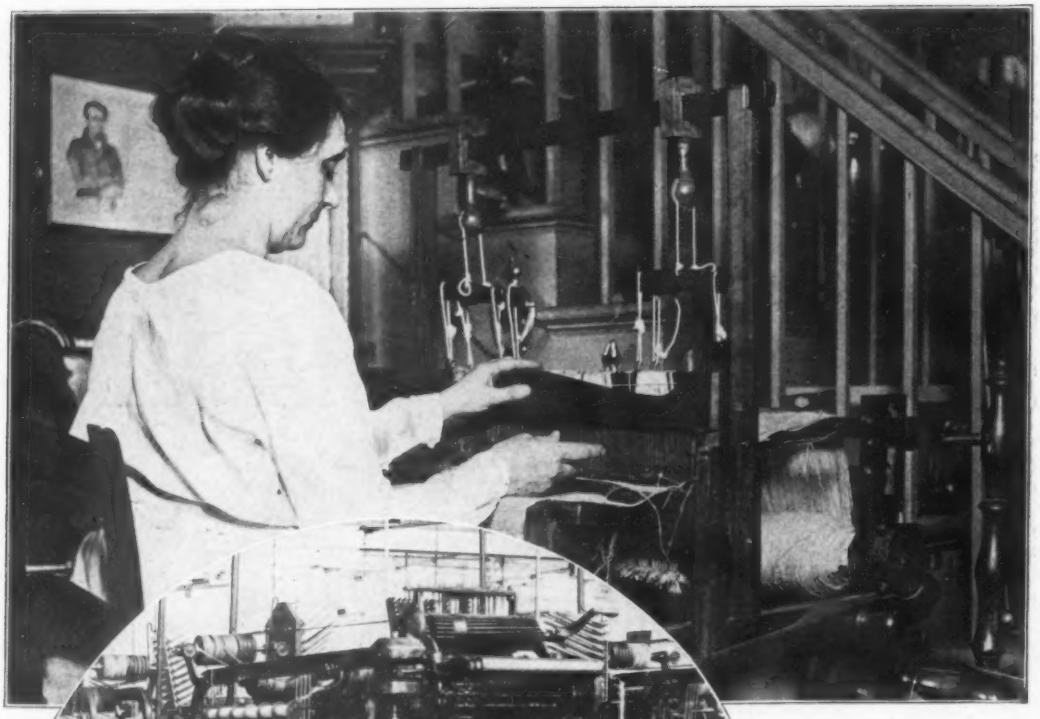
(FORMERLY SCHAUM & UHLINGER)

Glenwood Avenue, at Second Street, Philadelphia, U. S. A.

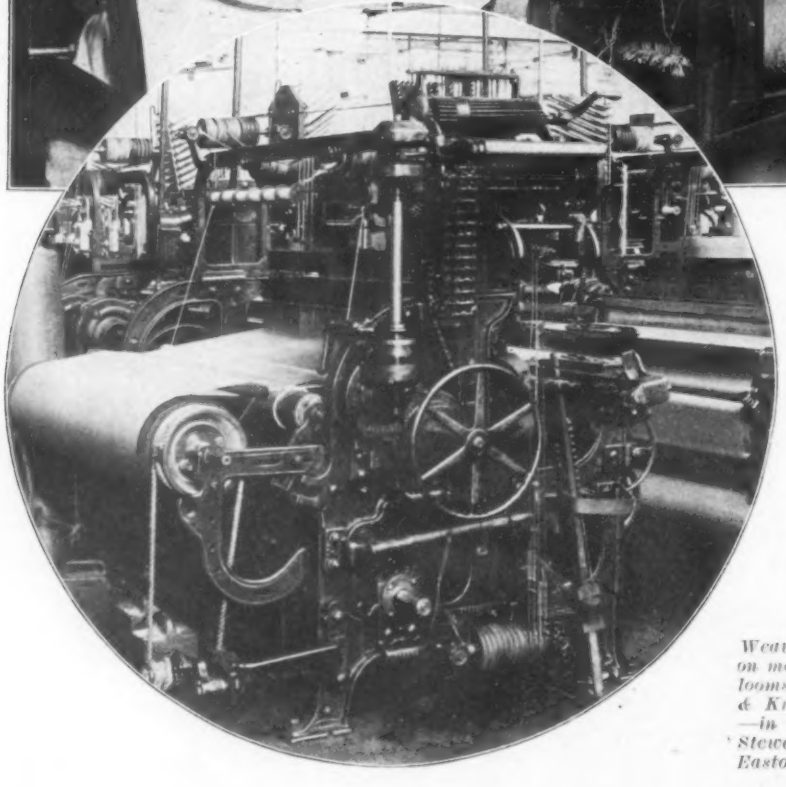
Also Manufacturers of

FLETCHER HIGH SPEED RIBBON LOOMS **FLETCHER ELASTIC WEBBING LOOMS**
FLETCHER COTTON TAPE LOOMS **FLETCHER CENTRIFUGAL EXTRACTORS**
FLETCHER MULTICONE CLUTCH

From Yards Per Week



Weaving yards per week on an old fashioned hand loom.



Weaving yards per hour on modern Hyatt equipped looms, built by Crompton & Knowles Loom Works —in operation at the Stewart Silk Company, Easton, Pa.

HYATT BEARINGS FOR

To Yards Per Hour

When carding, spinning and weaving were home industries quantity production was unimportant and crude textile machinery sufficed.

Textile production on a commercial scale, which brought all textiles within the price range of the average man, required greater production per unit of labor and machinery and thus led to a series of important improvements in textile machinery design.

The industry took a great step forward and upward when hand looms were superseded by power looms. **You** can take just as progressive a step today by discarding your old plain bearing looms and installing modern Hyatt Roller Bearing equipped looms.

Improved looms, with cut gears, Hyatt Roller Bearings and other refinements will:

1. ***Increase your production*** because they can be operated at higher speeds without excessive vibration.

2. ***Save power*** because these easy running bearings reduce friction at least 50%.

3. ***Decrease maintenance costs***—the rugged Hyatt Bearings protect themselves and surrounding parts of the loom from shock loads incident to banging off, etc.

4. ***Decrease lubrication costs***—looms equipped with Hyatt Bearings require lubrication only 3 or 4 times a year.

These improved looms have been effecting these economies for over five years for some manufacturers. Specify that your looms be Hyatt equipped and put your equipment on a modern basis.

1976

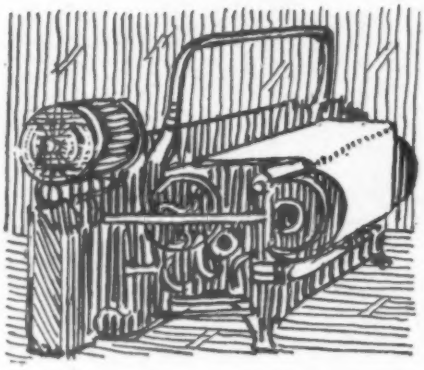
MOTOR BEARINGS DIVISION
DETROIT, MICHIGAN

HYATT ROLLER BEARING COMPANY
INDUSTRIAL BEARINGS DIVISION
NEW YORK, N. Y.

TRACTOR BEARINGS DIVISION
CHICAGO, ILLINOS

Manufacturers of Bearings for Mine Cars, Ore Cars, Steel Mill Cars, Roller Tables, Trolleys, Cranes, Hoists, Machine Tools Line Shafts, Countershafts, Concrete Machinery, Textile Machinery, Conveyors, Lift Trucks, Industrial Trucks, Railway Service Cars, Storage Battery Locomotives, etc.

TEXTILE MACHINERY



The Place of HUMIDITY IN COTTON MANUFACTURING

No. 8. Weaving

In Weaving, where production and quality are prime requisites, a high humidity must be carried. The kind and amount of sizing, the character of the goods themselves, require careful consideration as to the best humidity to run. Ordinarily this is found to be around 10 per cent to 11 per cent Regain, this representing a relative humidity of from 70 per cent to 78 per cent. Higher humidities are frequently used to great advantage, sometimes as high as 85 per cent to 88 per cent especially where automatic looms are used, as the straining on the warps is far greater than in the case of common looms.

However little advantage is gained in humidities over 80 per cent, as the depressing effect of excessive humidities is likely to offset the small gain obtained in the working of the fibre itself. With circulation of air, obtained from "Cramer" High Duty Fan Air Conditioners, or Central Station equipments, a weave room may be run with comfort to the operative at higher humidities than would be possible without circulation. Consequently, the type of equipment has much to dc with the problem of humidification.

Profit by "High Duty Climate"

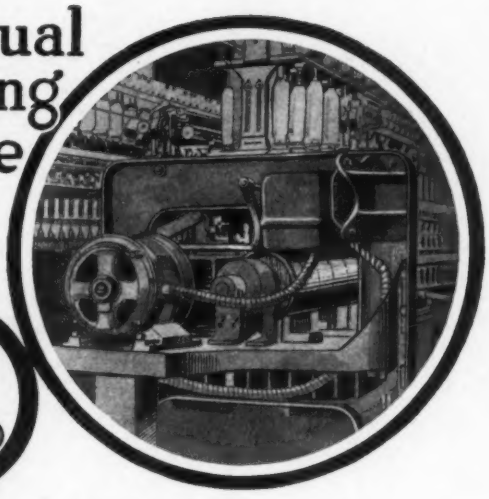
Parks-Cramer Company

Engineers & Contractors

Industrial Piping and Air Conditioning

Fitchburg Boston Charlotte

Individual Spinning Drive



W
WESTINGHOUSE ELECTRIC

The Mason Cotton Fabric Co.

Manufacturers of all Fabrics
For Mason Tires

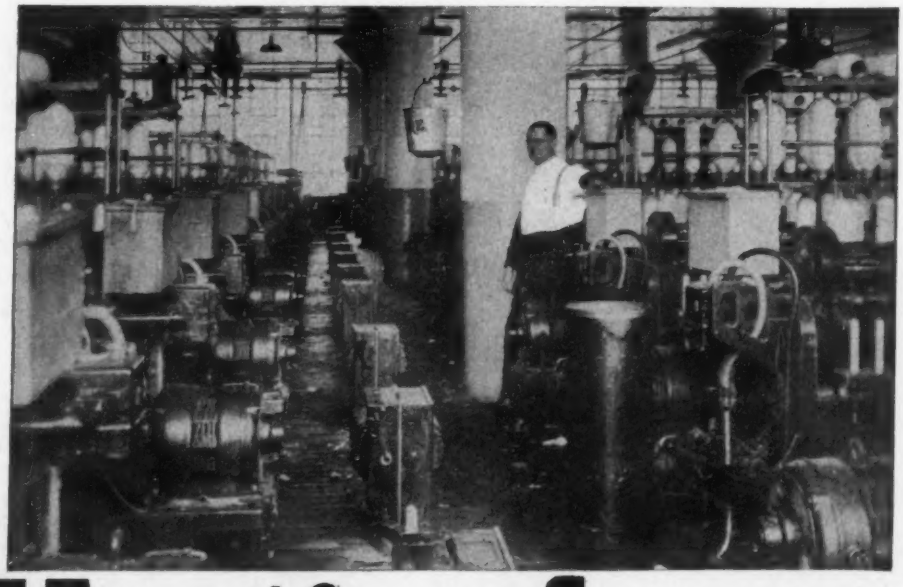
According to the best practice of today, the Mason Cotton Fabric Company has installed Westinghouse Individual Motor Drive on the spinning frames of its new mill at Kent, Ohio.

Thus this company is assured of from 5% to 7% greater production than can be produced with other methods of drive.

—Increased Production
—Better Plant Layout
—Freedom from Overhead Construction
—Better Lighting
—Cleanliness
—Congenial Working Surroundings

Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

Sales Offices in All Large American Cities.



Westinghouse

Sturtevant
PUTS AIR TO WORK

A Loom is as Efficient As the Air Around It

Had you ever thought of it that way?

Air that is efficient eliminates absolutely, every day in the year, static electricity—the cause of broken, twisted, and knotted threads.

It keeps the air free at all times of fly. This is better for the worker and better for the machine.

It assures strength and uniformity of the goods by providing necessary atmospheric moisture which is taken up by the fibres.

Efficient air in textile mills is air supplied by

Sturtevant
(REG. U. S. PAT. OFF.)

AIR-CONDITIONING SYSTEMS

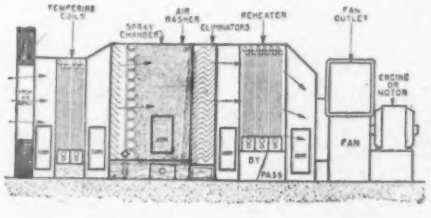
"Efficient air makes efficient looms."

A loom, although high priced, is relatively cheap in comparison to the *value* it produces. Increase this value through *more* product or *better* product and you decrease your overhe id proportionately.

Sturtevant Air-Conditioning Systems stand for increased value, which they make possible through continuous production and uniform quality of product.

May we send you the booklet, "Climate Doctors," which is full of interesting reading ?

Cross Section of Air-Conditioning System



Air is Always of Proper Temperature and Moisture

This sign, the symbol of the W. L Fleisher engineering and construction organization of New York, stands for expert service in air conditioning of textile mills. This service is coupled with the quality standard of Sturtevant apparatus, and its results are guaranteed.

B. F. STURTEVANT COMPANY

HYDE PARK, BOSTON, MASSACHUSETTS

AND ALL PRINCIPAL CITIES

"--a more satisfactory building at several thousand dollars less cost."

The following letter is one of many in our files and is just an indication of the reputation which we have among all of our clients:

"Mr. Fonda made possible the erection of our $100,000.00 Apartment House by effecting our financial arrangements, assisting our architect in redesigning the structural plan and producing for us a more satisfactory building at several thousand dollars less cost. Through his knowledge of effecting purchasing and working organizations he made additional savings to our personal observation which amounted to many thousand dollars. We found Mr. Fonda entirely trustworthy, dependable and a man who knows his line of work.

Mr. Fonda has directed several very large construction operations for some of my personal friends who all speak highly of his energy and ability. During the past year his operations in this vicinity went well past the million dollar column."

(Signed) D. L. MERIWETHER, Asheville, N. C.

Fonda Service is not an architectural service, nor is it merely a building service, but a constructive service in which the whole heart and soul of the Fonda Organization is working—fighting to save you money and yet produce the most efficient and perfect construction that is humanly possible. And when the construction is turned over to you, you can feel sure that it could not be duplicated at a lower cost—and you will realize why **"Master Builders"** is a part of our name.

Full details of Fonda Service should be in your files for future reference. Estimates gladly furnished on any building or construction, no matter how large or how small. Write us today.

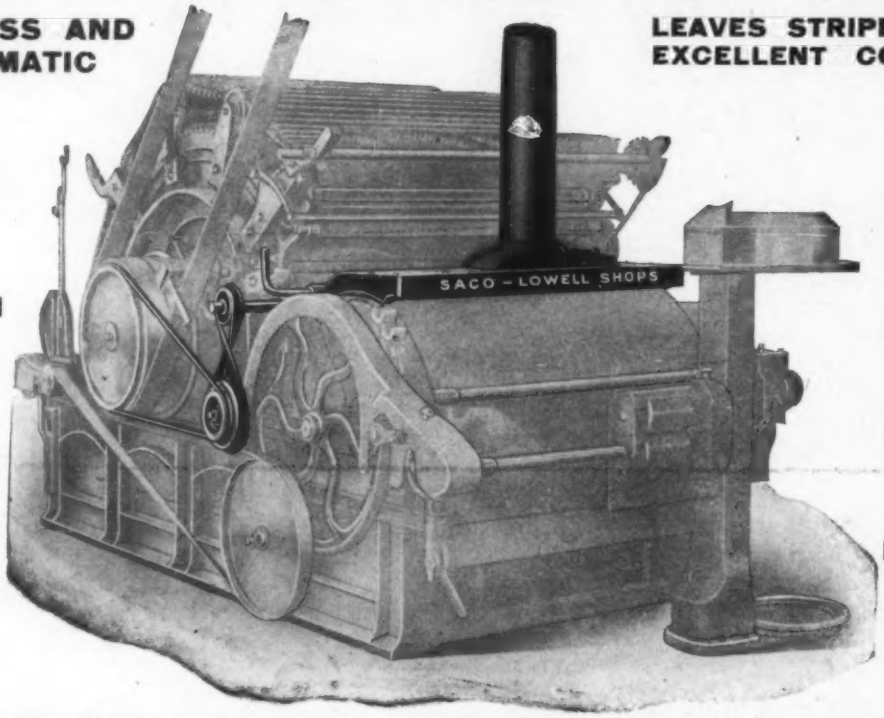
The E. A. FONDA ORGANIZATION of MASTER BUILDERS

GREENVILLE, S. C.
CHARLOTTE, N. C.

SACO-LOWELL CARD STRIPPER

DUSTLESS AND AUTOMATIC

LEAVES STRIPPINGS IN EXCELLENT CONDITION



Economical to Operate

Saves Time and Labor

Strips Card Clean

Sanitary and Efficient

Low Cost of Maintenance

Simple, Durable Practical

Control Always Absolute

Full Information Furnished

Rogers W. Davis, Southern Agent CHARLOTTE, N. C.

Saco-Lowell Shops, Newton Upper Falls, Mass.

Southern Branch Office GREENVILLE, S. C.

THE SIMPLEST AND THE MOST ELABORATE

FABRICS

Are produced on

LOOMS

From the

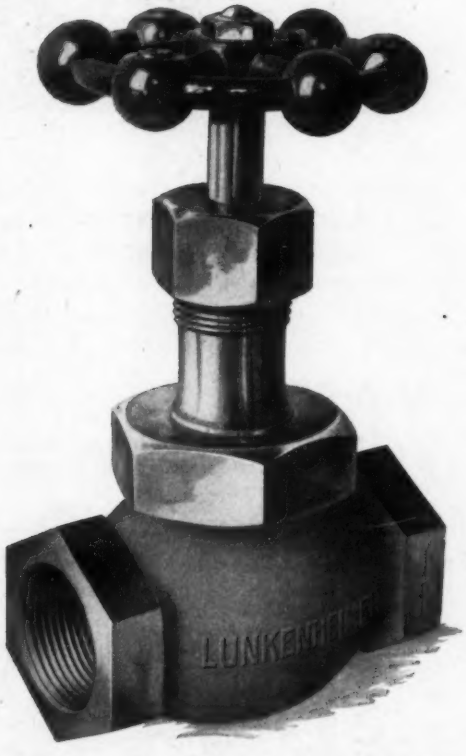
Crompton & Knowles Loom Works

WORCESTER, MASS.

Providence, R. I. Paterson, N. J. Philadelphia, Pa.

Alexander & Garsed, Southern Representative, Charlotte, N. C.

LUNKENHEIMER
Regrinding Valves



LUNKENHEIMER Regrinding Valves have firmly established their unparalleled merit by the successful results they have given in all classes of service.

The metal to metal seat—ground to a tight fit, forms the ideal seating surface to resist the wearing action of steam at high velocity. And the fact that the seating surfaces can be reground (an inexpensive operation easily accomplished), makes the renewal of parts wholly unnecessary.

Their extreme durability due to correctly proportioned parts, high quality materials and expert workmanship insures economy in maintenance.

Globe, Angle and Cross, and Horizontal, Angle, Vertical and Swing Check Patterns.

Specify LUNKENHEIMER and insist on their installation. Distributors of Lunkenheimer Products situated in every commercial center.

THE LUNKENHEIMER CO.
"QUALITY"

Largest Manufacturers of
High Grade Engineering Specialties
in the World

NEW YORK CHICAGO CINCINNATI BOSTON LONDON

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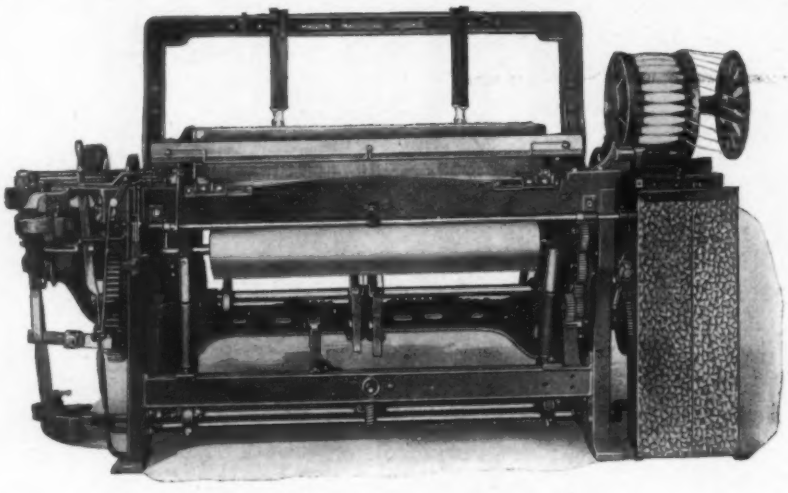
Mason Automatic Loom



With Battery, Warp Stop Motion, Feeler and Shuttle Lock

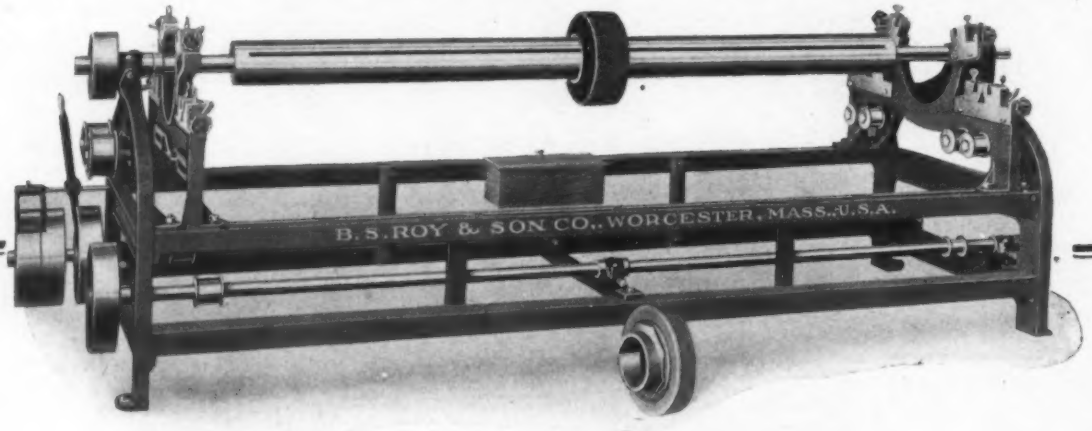
RANDOLPH CROMPTON'S PATENTS

Fewer Parts Standard Construction Rebounding Shuttles Overcome
Damage to Bobbins and Shuttles Prevented

We also build Revolving Flat Cards; Drawing Frames, Ring Spinning Frames; Duck Looms in various widths and weights; Silk Looms—Single Box and Two Box; Wide Sheeting Looms.

Mason Machine Works Co., Taunton, Mass.

E. HOWARD, Southern Agent, Greenville, S. C.



A Roy Grinder Pays Back Its Cost

You have a considerable investment in your Napping and Carding Machinery and only by keeping that machinery in the best condition can you secure the greatest production.

Money applies to your credit every time a Roy Grinder is used, and in a short time the purchase price comes back. These dividends are paid by increased efficiency of your carding and napping machinery.

WRITE FOR BULLETINS

B. S. ROY & SON CO., Worcester, Mass.

Established 1868

E. M. TERRYBERRY, Southern Agent, 1126 Healy Bldg., Atlanta, Ga.

Immediate Delivery!

GREIST

LOOM DROP WIRES

Are made of a special grade heddle wire. They are uniformly finished, accurate in design, free from burrs. A comparative test will readily convince you that they are superior to any drop wires on the market.

Because of our large manufacturing facilities we are able to fill orders of any size immediately. In addition to our many standard designs, we are prepared to make drop wires in any quantity from your own specifications.

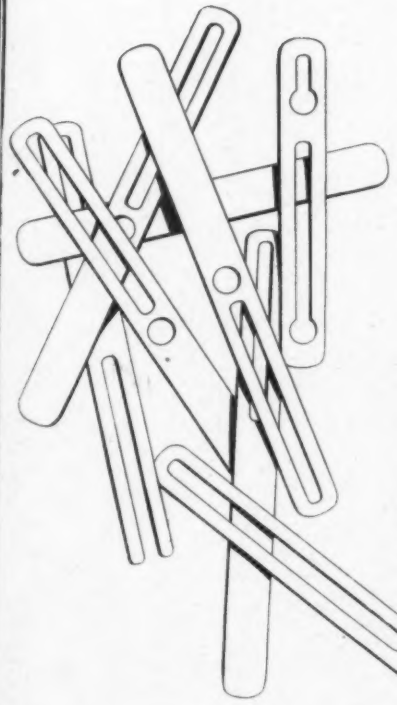
Since 1871 the Greist Manufacturing Company has been the world's largest maker of sewing machine attachments, and is a dependable source of supply for you to rely upon for drop wires.

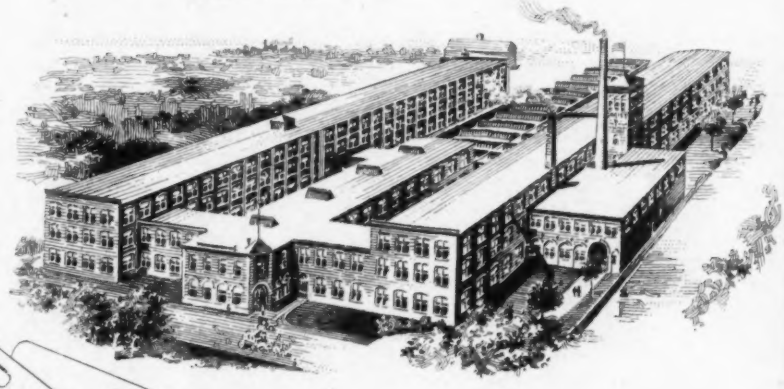
The Griest Manufacturing Company, Dept. C, New Haven, Conn.

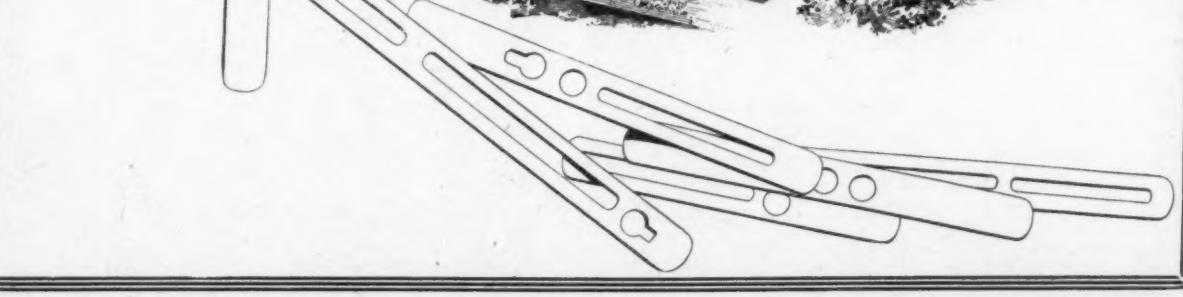
New England Representative:
Boyd's Textile Bureau. F. W. Boyd, Manager,
339 Butler Exchange, Providence, R. I.

Fall River and New Bedford:
Coldwell Gildard Company,
108 Hartwell St., Fall River, Mass.

Southern Representative:
The G. G. Slaughter Machinery Company,
Greenville, S. C.



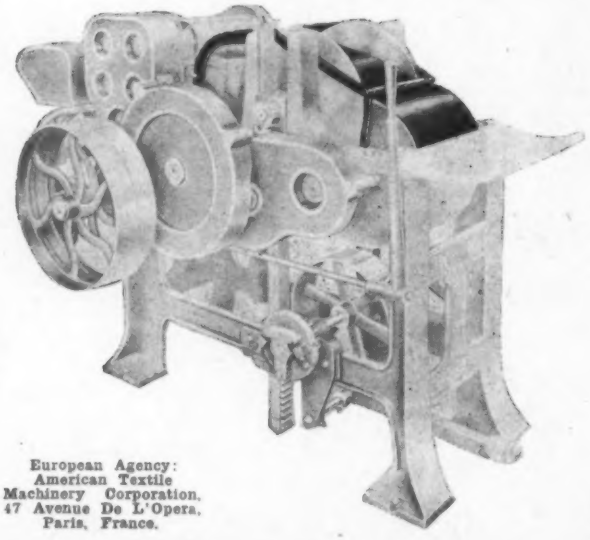




WHITIN MACHINE WORKS

ESTABLISHED 1831

TEXTILE MACHINERY



European Agency:
American Textile
Machinery Corporation,
47 Avenue De L'Opera,
Paris, France.

"SAFETY FIRST"

Liability of Accident
is Eliminated
by the use of the
Whitin Patented Guard
applied to
Sliver Lap Machines

Descriptive Circular on Request.

MAIN OFFICE AND WORKS

WHITINSVILLE, MASS., U.S.A.

SOUTHERN OFFICE CHARLOTTE N.C.

Saving Money on Picker Sticks

Consider these facts—they're important.

Changing a picker stick on a loom usually requires ten or fifteen minutes—say ten. Suppose three changes a year are necessary on each loom, and you have five hundred looms running. You find your looms have lost fifteen thousand minutes, or two hundred and fifty hours.

Now, suppose your sticks would only have to be changed twice a year or less. You at once find that 83 1/3 loom hours, or more, have been saved, to say nothing of this same amount of saved time your loomfixers can spend on other work.

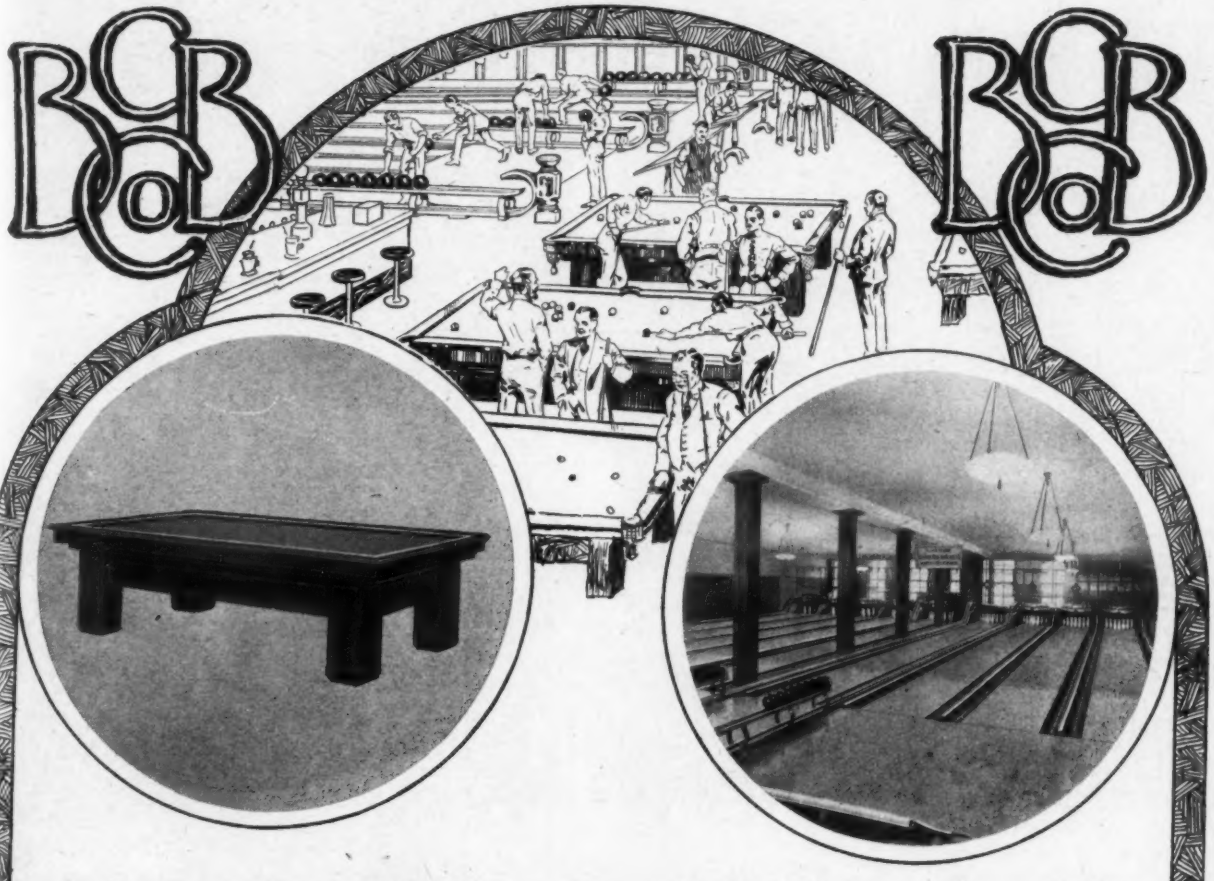
Of course, the more efficient your sticks are, the more apparent will be the saving.

During the coming year, the closer a manufacturer watches these operating leaks, the greater will be his reward financially.

P. S. The sticks we make are effecting savings like this every day. Make us prove it!

Southern Bending Co.

Johnson City, Tenn.



Try Out This Plan in Your Mill, Your Men Will Be Enthusiastic.

Numerous mills who have installed billiard tables and bowling alleys have found that their men take great pride in becoming good bowling and billiard players, and have formed bowling and billiard teams that keep the men contented and eliminate their desire to seek outside amusements in doubtful places.

Try this plan in your mill and inoculate your employees with the get-together spirit. Encourage their teams and probably offer prizes and cups for championship players. Show them you are interested in their welfare, and incidentally you will be increasing their health and productiveness as both bowling and billiards contain the proper exercise so essential to good health. Bowling is one of the best cures for indigestion and constipation.

Help your help—pay them a fair price for their work, give them the kind of recreation and amusement they like, and you will have healthy contented workmen which in turn will mean higher class work and larger production.

Our plan has been found a paying investment in many mills. May we send you full information and bowling and billiard catalogs?

BRUNSWICK-BALKE-COLLENDER CO.

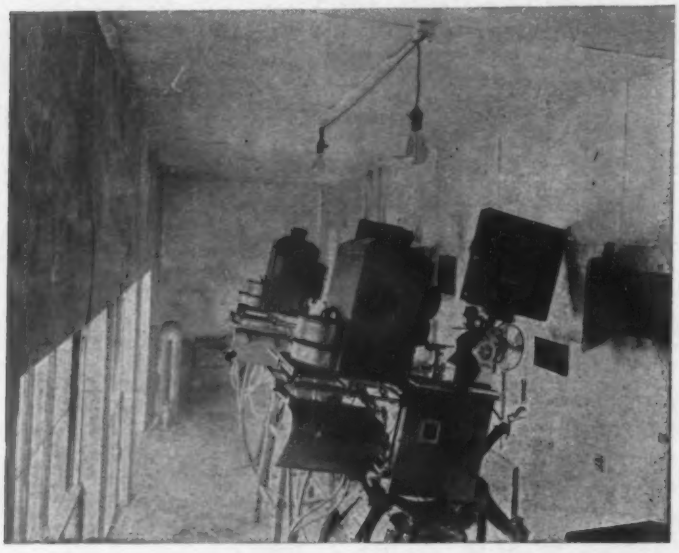
623-633 So. Wabash Ave., Chicago, Ill.
Branches in Principal Cities.

Brunswick

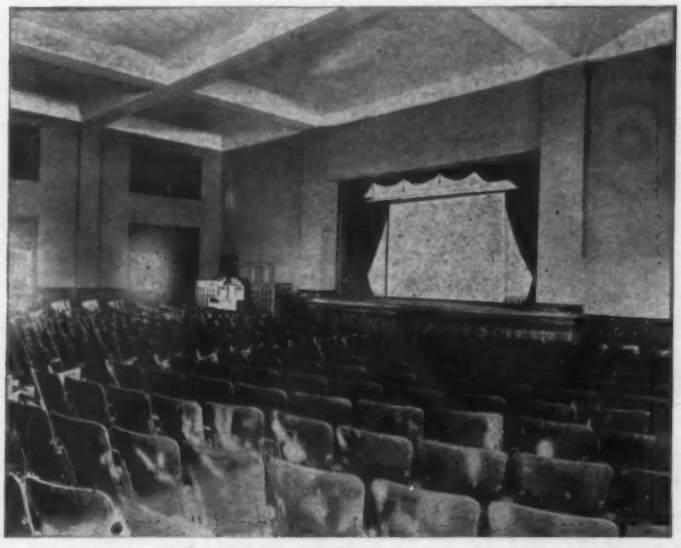
Billiard Tables and Bowling Alleys

Tables for Home and Residence Use.

Better Motion Pictures For Textile Mill Employees



Showing Installation of Power's 6 B Motion Picture Machines in the Tucupau Mills Theatre.



Showing Interior of Tucupau Mills Theatre, Tucupau, S. C.

THE textile industry is demanding the best moving pictures for their employees, and that is why more

POWER'S PROJECTORS

are used by textile mills in the South than all other projectors combined.

Here Are a Few of the Mills Using Power's

Exposition Cotton Mill	Atlanta, Ga.
Bibb Manufacturing Co.	Columbus, Ga.
Bibb Manufacturing Co.	Porterdale, Ga.
Gainesville Cotton Mill	Gainesville, Ga.
Habersham Mill	Habersham, Ga.
Hillside Cotton Mill	LaGrange, Ga.
Manchester Mill	Manchester, Ga.
Milstead Mill	Conyers, Ga.
Thomaston Cotton Mill	Thomaston, Ga.
Roswell Manufacturing Co.	Roswell, Ga.
Trion Company	Trion, Ga.
Rocky Mount Cotton Mill	Rocky Mount, N. C.
Rodman-Heath Cotton Mill	Waxhaw, N. C.
Pomona Mills	Greensboro, N. C.
Cleveland Mill & Power Co.	Lawndale, N. C.
Spray Cotton & Woolen Mills	Spray, N. C.
Issaquena Mills	Central, S. C.
D. E. Converse Co.	Glendale, S. C.
Monoghan Mills	Greenville, S. C.
Woodside Mills	Greenville, S. C.
Pacolet Manufacturing Co.	Pacolet, S. C.
Tucupau Mills	Tucupau, S. C.
Victor Mills	Greer, S. C.
Victor-Monoghan Mills	Seneca, S. C.
Victor-Monoghan Mills	Walhalla, S. C.
Victor-Monoghan Mills	Jonesville, S. C.
Ware Shoals Manufacturing Co.	Ware Shoals, S. C.
Glenn-Lowry Manufacturing Co.	Whitmire, S. C.
Lanett Mills	Lanett, Ala.
Indian Head Mills	Cordova, Ala.
Selma Manufacturing Co.	Selma, Ala.
Central Mills	Sylacauga, Ala.
Tallahassee Falls Manufacturing	Tallahassee, Ala.

Our experience in Theatre Equipment is at your service

"WE HAVE A SPECIAL OFFER"

Southern Theatre Equipment Company

No. Nine Nassau St.
ATLANTA, GEORGIA

Eighteen Fifteen Main St.
DALLAS, TEXAS

How Clean Are

CLEAN FLOORS

The scrubwoman wearily wields her brush with steadily weakening force. When she has finished, the floor is called CLEAN.

But *is* it CLEAN?

There are *no degrees* of cleanliness. If it isn't one hundred per cent, it isn't CLEAN.

When the floor has thoroughly dried, rub a wet finger briskly over a small section. Very likely you will find a thin, hardened film of soap which ordinary scrubbing or mopping cannot remove.

It takes more "elbow grease" than scrubwomen have to really CLEAN the average floor. It takes the steady, flexible pressure of the FINNELL SCRUBBER to get right down into the crevices and pores and pull out the imbedded dirt.

More than a hundred different lines of industry have learned that CLEAN FLOORS have definite commercial value. To some they are good advertising. To some they spell superior service. To others they signify health. To still others they mean a CLEAN product made by CLEAN people.

Write our Chicago offices for complete information.

FINNELL SCRUBBER
is now used in many
Auditoriums
Bakeries
Banks
Bottling Works
Candy Factories
Churches
Colleges
Department Stores
Factories (Miscellaneous)
Food Products Factories
Halls
Hospitals
Hotels
Knitting Mills
Public Buildings
Restaurants
Retail Stores
Schools
Textile Mills
Wholesale Groceries
Y. M. C. A.'s
and miscellaneous buildings

Names furnished on request. State which class interests you.

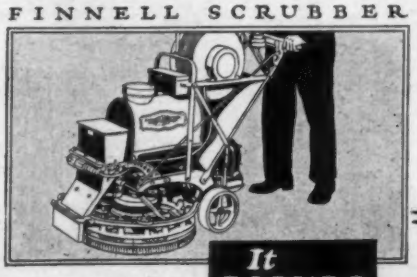
AMERICAN SCRUBBING EQUIPMENT CO.
Also manufacturers of Finola Scouring Powder
General Offices: 188 N. Wabash Ave., Chicago Factories: Hannibal, Mo.

DISTRICT OFFICES

ATLANTA	BUFFALO	DENVER	LOS ANGELES	NEWARK	PHILADELPHIA	SALT LAKE CITY
BALTIMORE	CHICAGO	DETROIT	LOUISVILLE	NEW ORLEANS	PITTSBURGH	SAN FRANCISCO
BOSTON	CINCINNATI	INDIANAPOLIS	MILWAUKEE	NEW YORK	PROVIDENCE	SEATTLE
	CLEVELAND	KANSAS CITY	MINNEAPOLIS	OMAHA	ST. LOUIS	

FINNELL SYSTEM
OF POWER SCRUBBING

FINNELL SCRUBBER



It **SCRUBS** *Electrically!*

"CLEAN FLOORS Reflect Clean Business"

ADVERTISING

By DR. FRANK CRANE

(Copyright by Frank Crane)

ADVERTISING is the greatest business in the world. That is not because it enables business people to sell more goods, not because it is a way to make great profits. Nothing can be really great for any purely dollars-and-cents reason.

It is because, in advertising, business becomes vocal. When, in the course of evolution, the animal acquired speech and became able to utter himself, he had made the longest stride in development. He had stepped from brute to man.

The human soul dates back to the first word. "In the beginning was the Word."

Advertisement is the utterance of human energy. Craftmanship is good, and industry, and organization, and business ability; but they are dumb giants until they find speech—dumb and dangerous.

Business, including manufacturing, farming, transportation, and selling is to the new world what fighting was to the old. The old world organized only to kill, and its genius was displayed by great generals. Its heroes were the mighty killers. To them it set up its statues.

The new world, typified by, led by America, is organized to serve, to make human life richer, deeper, stronger, more complex and heterogeneous.

And business is simply service. Business comes to itself, attains maturity and full self-expression only through advertising.

Advertising is the breath of life breathed into the nostrils of business, by which it becomes a living soul.

Thus advertising not only enlarges business; it radically changes the nature of business.

By it business passes from bureaucracy and autocracy into democracy. It takes the whole people into its growth. It enters the veins of the commonwealth. It becomes a function of communal life.

Without advertising comes decay and death.

Nations need advertising. If they would advertise they would prevent war. War is the self-expression of dumb brute force.

Advertising is the self-expression of intelligent strength that knows how to speak.

It is the something plus in advertising that is significant. It is this something plus that makes advertising to business what art is to handiwork, what music is to feeling, what language is to the soul.

LIST OF MEMBERS

Each has subscribed to and is maintaining the highest standards of practice in their editorial and advertising service.

Advertising and Selling
American Architect
American Blacksmith
American Exporter
American Funeral Director
American Hatter
American Machinist
American Paint Journal
American Paint and Oil Dealer
American Printer
American School Board Journal
Architectural Record
Automobile Dealer and Repairer
Automobile Journal
Automotive Industries
Bakers Weekly
Boiler Maker
Boot and Shoe Recorder
Brick and Clay Record
Buildings and Building Management
Building Supply News
Bulletin of Pharmacy
Canadian Grocer
Canadian Railway & Marine World
Candy and Ice Cream
Chemical & Metallurgical Engineering
Clothier and Furnisher
Coal Age
Coal Trade Journal
Concrete
COTTON
Daily Metal Trade
Distribution and Warehousing
Domestic Engineering
Dry Goods Economist
Drygoodsman
Dry Goods Reporter
Electric Railway Journal
Electrical Merchandising
Electrical Record
Electrical World
Embalmers' Monthly
Engineering and Contracting
Engineering and Mining Journal
Engineering News-Record
Factory
Farm Implement News
Farm Machinery—Farm Power
Fire and Water Engineering
Foundry (The)
Furniture Journal
Furniture Manufacturer and Artisan
Furniture Merchants' Trade Journal
Gas Age
Gas Record
Grand Rapids Furniture Record
Haberdasher
Hardware Age
Heating and Ventilating Magazine
Hide and Leather
Hospital Management
Hotel Monthly
Illustrated Milliner
Implement and Tractor Age
Implement & Tractor Trade Journal
Industrial Arts Magazine
Inland Printer
Iron Age
Iron Trade Review
Lumber
Lumber Trade Journal
Lumber World Review
Manufacturers' Record
Manufacturing Jeweler
Marine Engineering
Marine Review
Millinery Trade Review
Mill Supplies
Mining and Scientific Press
Modern Hospital
Motor Age
Motorcycle and Bicycle Illustrated
Motor Truck
Motor World
National Builder
National Druggist
National Petroleum News
Nautical Gazette
Northwest Commercial Bulletin
Northwestern Druggist
Nugent's, The Garment Weekly
Oil News
Oil Trade Journal
Plumber and Steam Fitter
Power
Power Boating
Power Farming Dealer
Power Plant Engineering
Price Current—Grain Reporter
Printers' Ink
Railway Age
Railway Electrical Engineer
Railway Maintenance Engineer
Railway Mechanical Engineer
Railway Signal Engineer
Retail Lumberman
Rubber Age and Tire News
Shoe Findings
Shoe and Leather Reporter
Shoe Retailer
SOUTHERN ENGINEER
SOUTHERN HARDWARE & IMPLEMENT JOURNAL
Sporting Goods Dealer
Starchroom Laundry Journal
Tea and Coffee Trade Journal
Textile World Journal
Welding Engineer
Woodworker

THE ASSOCIATED BUSINESS PAPERS, INCORPORATED

HEADQUARTERS - - - - - 220 WEST 42nd STREET - - - - - NEW YORK

PACKARD

3,000 Tons in 120 Days

The ability of Packard trucks to maintain a schedule that saves both time and money through prompt deliveries has led to their extensive use in the cotton industry.

A. H. Meyers, of Sequoin, Texas, for example, is using a Packard truck for hauling cotton, cotton seed, coal and corn from the gin at Geronimo to the railroad station, six miles distant.

To make this hauling profitable, a truck must handle a minimum of 3,000 tons in 110 to 120 days.

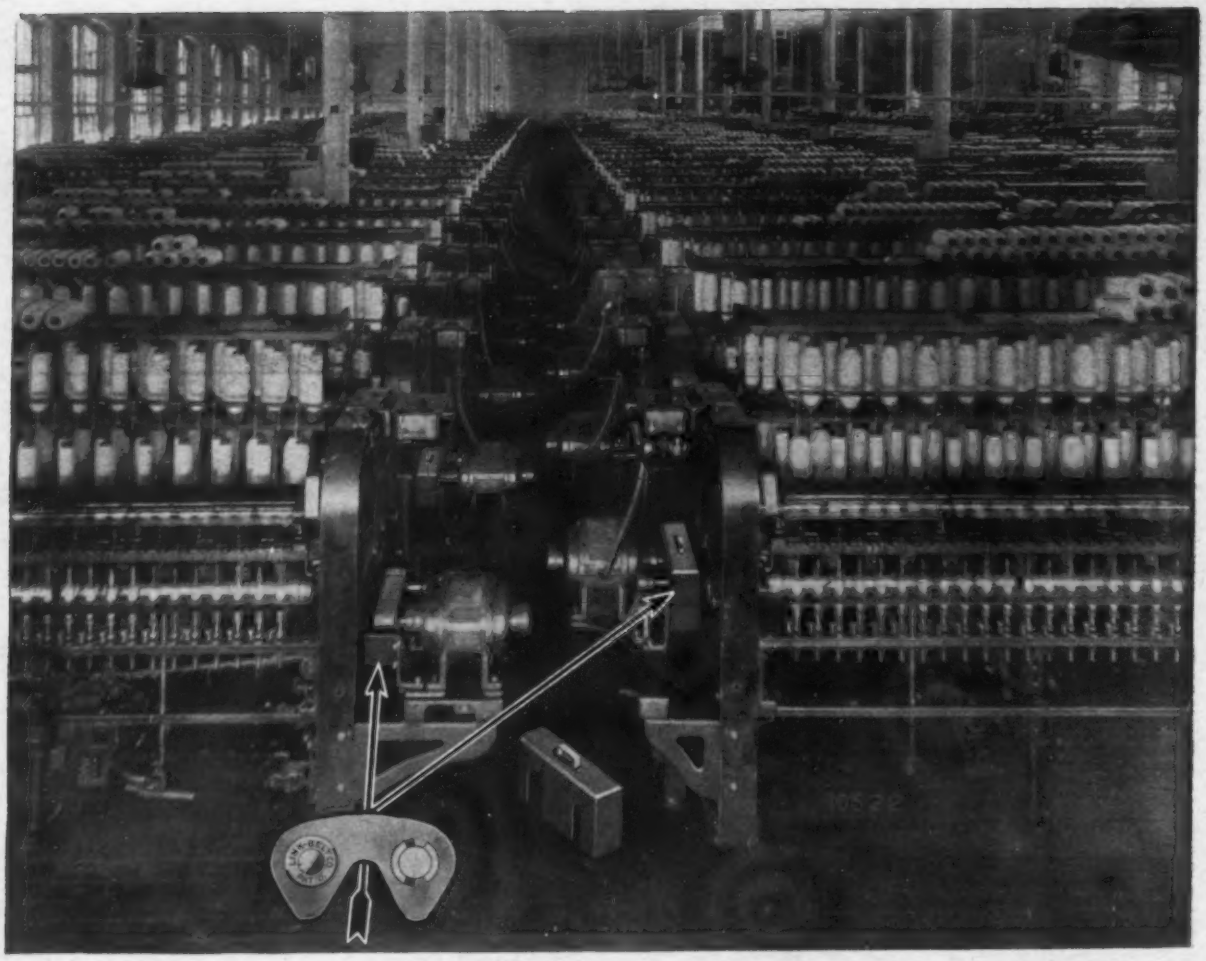
The Packard, however, has more than met the requirements of its job.

With a semi-trailer attached, it is delivering slightly over nine tons to the load. It is on the road day in and day out, running on regular schedule and combining promptness with thrift.

This is no exceptional record. Packard trucks habitually do more work at lower cost because they are correctly designed, precisely built and scientifically specified to the job.

PACKARD MOTOR CAR COMPANY · DETROIT

Ask the man who owns one



Efficient Power Transmission

THE selection of the correct power transmission for the varied types of machinery used in Textile Mills today should be accorded the same careful thought that is given to the manufacture of the product of the mill.

When investigations are made Link-Belt Silent Chain Drives are usually selected because Link-Belt Silent Chain combines the best points of the leather belt with the positive action of gears, minus their disadvantages.

Upon the power transmitting medium depends not only a saving or a waste of power, but, what is more important, an increase or decrease in the production. Also a uniformly perfect product results from the use of a uniformly smooth-running drive. Therefore, give this subject—the selection of the proper driving medium—the attention it deserves.

The day has passed when anyone can afford to waste power (money), or fail to adopt modern methods which mean "safety-first", and an increase in production—equipment such as the Link-Belt Silent Chain Drive, which requires minimum attention and gives such reliable, efficient service.

Let one of our experienced power transmission engineers call on you and explain the effectiveness of transmitting power to your machines with the Link-Belt Silent Chain Drive.

Write for 128 page price list Data Book No. 125.

LINK-BELT COMPANY 512

PHILADELPHIA CHICAGO INDIANAPOLIS

Atlanta, Ga.—707 Citizens and Southern Bank Bldg. Charlotte, N. C.—J. S. Cothran, Com'l Bank Bldg. Birmingham, Ala.—S. L. Morrow, 720 Brown-Marx Bldg.

LINK-BELT
SILENT CHAIN DRIVES

Year after Year

Deep into the heart of the industrial world ***"Cocheco"*** has wended its way because of its superior merits and "year after year" service qualities. Some ***"Cocheco" Belting*** sold more than 20 years ago is still rendering consistent service. This fact alone proves the actual value of obtaining quality belting and proves the economy of ***"Cocheco."***

"Cocheco" Belting is made of carefully selected leather. It is taken from the center part of the butt—a strip recognized as the toughest and most durable. It is pure oak tanned.

Quality belting cannot be obtained at the same price as cheap belting. That is why the initial cost of ***"Cocheco" Belting*** is slightly higher than for ordinary belting. You pay for quality and ***you get it.***

Cocheco Belting, in the long run, will be found the most economical belting obtainable.

Write us today. We will gladly advise upon your belting problems.

COCHECO TRADE MARK BELTING

COCHECO

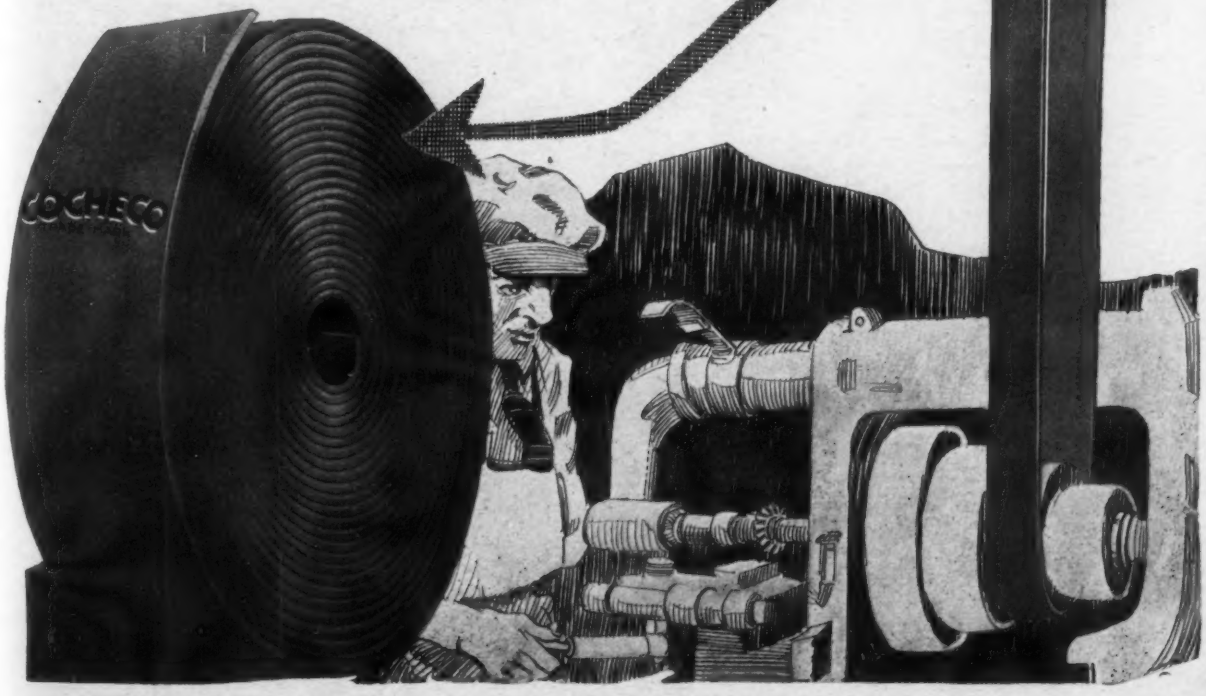
BELTING

Quality Belting Since 1842

I. B. WILLIAMS & SONS

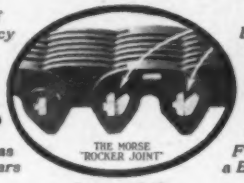
Dover, New Hampshire U. S. A.

BOSTON, MASS., 157 Summer St. NEW YORK, N. Y., 71-73 Murray St.
CHICAGO, ILL., 14-16 N. Franklin St.



The Sign of Efficiency

MORSE DRIVES



The Sign of Durability

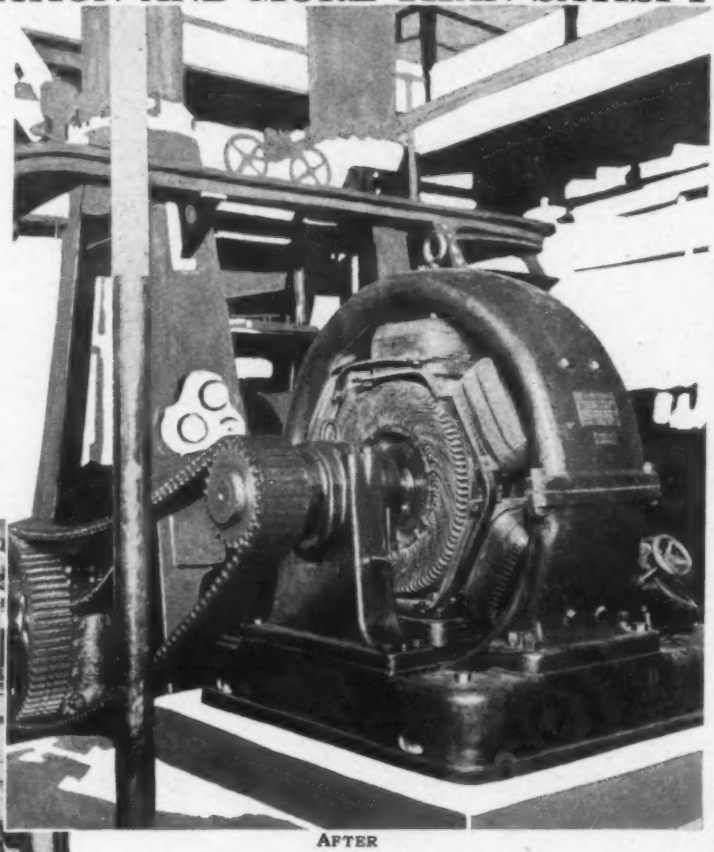
Positive as Gears

Flexible as a Belt

Longer Life

SAVED THE SITUATION AND MORE THAN SATISFY

PRODUCTION and Cost confronted this well known Meat Packing House in Baltimore. They contemplated taking out Corlis Engine driven Ammonia Compressor and installing a new direct connected set. The engineers consulted "MORSE ENGINEERING SERVICE" and thru the use of MORSE Silent Chain Drives, this expense was cut down, floor space saved, efficiency increased, and a still more satisfactory operating compressor maintained.



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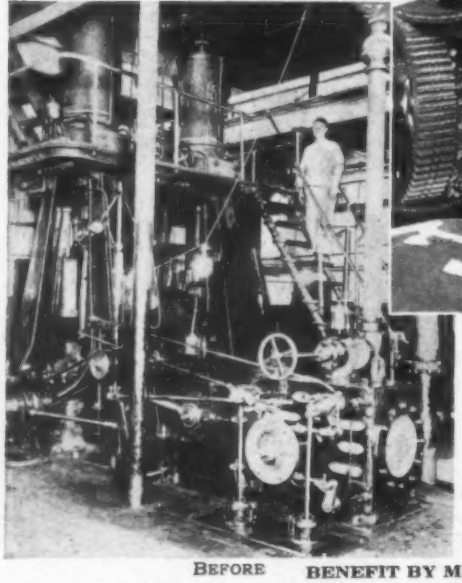


BEFORE

100 H. P. Drive, 106" Centers, 8" Wide, 2" Pitch, 25—69 Teeth, 150—54 R.P.M.

No Slip, 98.6% Efficiency. Oil Baths not Required

Are you looking for improvement in power transmission, the saving of fuel, the saving of floor space by short centers, fixed speed ratios, improved quality, increased production, lower maintenance cost, longer life and dependability, the increase of profits now lost through slipping belts? Investigate MORSE Silent Chain Drives. Let MORSE Engineers give your conditions their careful research.

BENEFIT BY MORSE SERVICE AS OTHERS DO

Write Today for Booklet

MORSE CHAIN CO., ITHACA, N. Y.

Morse Engineering Service

LARGEST MANUFACTURERS OF SILENT CHAINS IN THE WORLD

Assistance Without Obligation

Address Nearest Office

BALTIMORE, MD.....1402 Lexington Bldg.
BOSTON, MASS.....141 Milk Street
CHICAGO, ILL.....Merchants Loan & Tr. Bldg.
CLEVELAND, OHIO.....Engineers Bldg.
DETROIT, MICH.....Cor. 8th & Abbott Sts.
CHARLOTTE, N. C.....404 Commercial Bk. Bldg.
NEW YORK CITY
50 Church St., Hudson Term. Bldg.
PITTSBURGH, PA.....Westinghouse Bldg.
PHILADELPHIA, PA.....302 Harrison Bldg.
SAN FRANCISCO, CALIF.....Monadnock Bldg.
ATLANTA, GA., Earl F. Scott, M. E.....702 Candler Bldg.
CANADA.....Jones & Glassco, Reg'd.
MONTREAL.....St. Nicholas Bldg.
TORONTO.....Traders' Bk. Bldg.
KANSAS CITY, MO., Morse Engineering Co.....Finance Bldg.
MINNEAPOLIS, MINN.....Strong-Scott Mfg. Co. 413 Third St., S.
ST. LOUIS, Mo., Morse Engineering Co.....Chemical Bldg.

"Morse" is the Guarantee Always Behind the Efficiency, Durability and Service

SKF
Research Laboratory established at Philadelphia to co-operate with the Gothenburg Laboratories in the study of the American Manufacturers' friction problems.

THE technical advice brought you by our engineers embodies the experience of highly trained organizations in all parts of the world in the solving of friction problems.

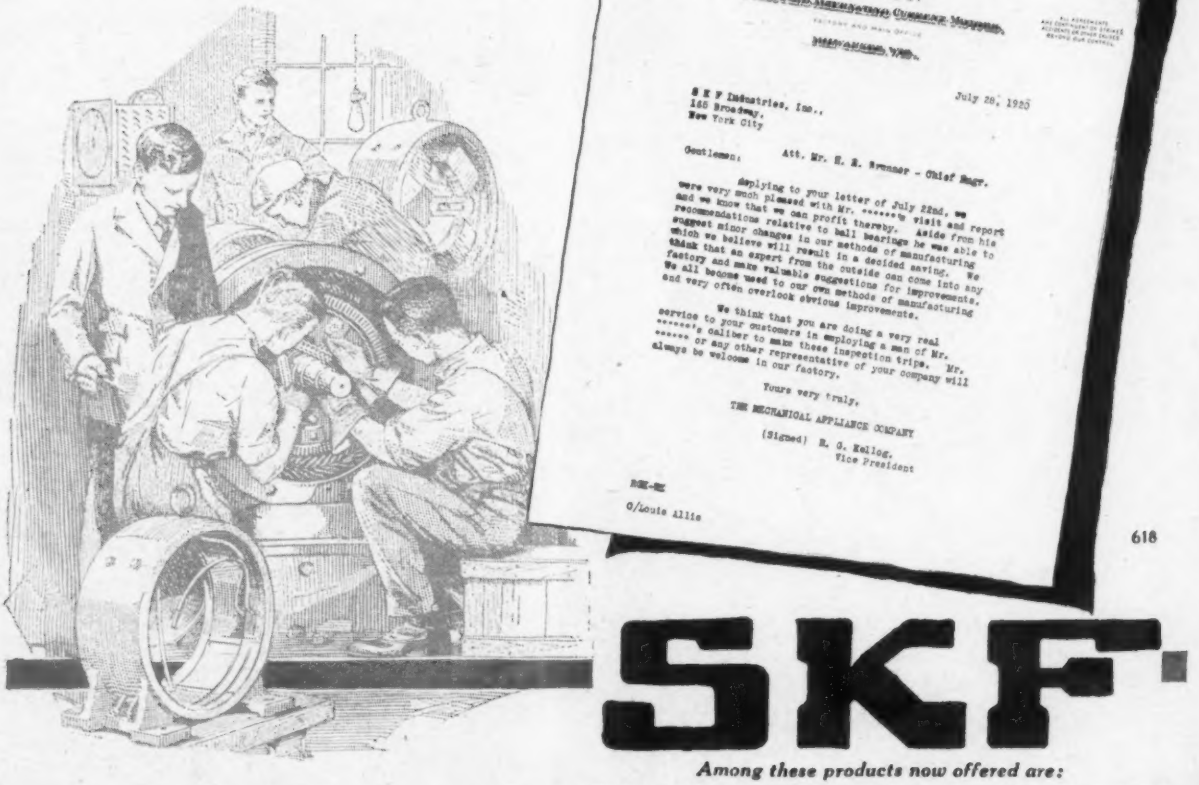
This international experience is both technical and practical and is acquired in co-effort with the best international research endeavor.

SKF service in America is linked to this international experience. Its tangible evidence is found in products marked " **SKF** " and in the advice supplied you by our engineers.

SKF Industries, Inc.

165 Broadway, New York City

Supervising at the request of the stockholders.
- The Hess-Bright Manufacturing Co.
- SKF Ball Bearing Co.
- Atlas Ball Co.
- Hubbard Machine Co.
- SKF Research Laboratories



THE MECHANICAL APPLIANCE COMPANY

WATSON

July 28, 1920

S K F Industries, Inc.,
165 Broadway,
New York City

Gentlemen: Att. Mr. H. H. Brenner - Chief Engr.

Replying to your letter of July 22nd, we were very much pleased with Mr. ******'s visit and report and we know that we can profit thereby. Aside from his recommendations relative to ball bearings he was able to suggest minor changes in our methods of manufacturing which we believe will result in a decided saving. We think that an expert from the outside can come into any factory and make valuable suggestions for improvements. We all become used to our own methods of manufacturing and very often overlook obvious improvements.

We think that you are doing a very real service to your customers in employing a man of Mr. ******'s caliber to make these inspection trips. Mr. ****** or any other representative of your company will always be welcome in our factory.

Yours very truly,

THE MECHANICAL APPLIANCE COMPANY

(Signed) E. G. Kellog.
Vice President

EGK-EC

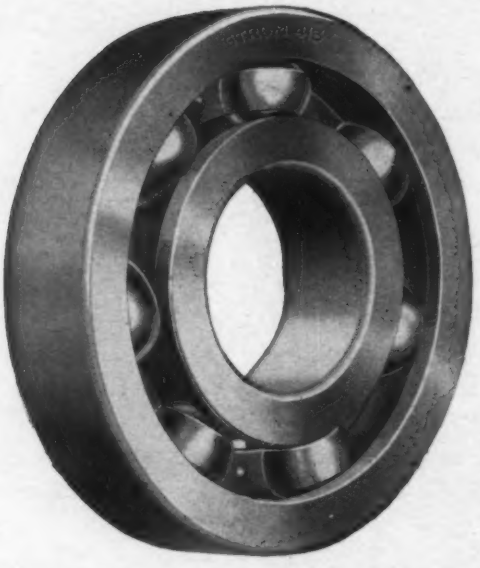
O/Louis Allis

618

SKF

Among these products now offered are:

Single row deep groove ball bearings. Thrust bearings. Steel balls.
Double row self aligning ball bearings. Transmission equipment.



Why Endanger the Quality of Your Product?

The picker room regulates the quality of the yarn. The condition of beater and fan bearings governs the quality of the output of the picker.

Badly worn beater bearings mean poor, smudged lap and wasted oil.

Strom ball bearings with their extra large balls and heavy,deep-grooved raceways keep the beaters always in permanent, perfect adjustment.

They save power, maintenance expense, and avoid shutdowns due to hot boxes.

Strom bearings especially mounted for textile applications may be obtained through our distributor, the Aldrich Machine Works, Greenwood, S. C.

Radial bearings made in a wide range of sizes for light, medium and heavy duty. Angular contact bearings especially designed to support combinations of radial and heavy end thrust loads. Thrust bearings made in all types and sizes with flat and grooved races.

U. S. Ball Bearing Mfg. Co.
(Conrad Patent License)
4544 Palmer St., Chicago, Illinois.

82

Strom BEARINGS

When You Consider Improved Textile Machinery

And you are looking for increased production—a better product
You should give a thought to more modern lubrication—
To reduce the cost of expensive repairs
And to keep expensive machinery *at work*—all the time—at top notch efficiency
All this points to

TRADE MARK REGISTERED IN
NON-FLUID OIL
UNITED STATES PATENT OFFICE

Modern Textile Lubricants

And they are just as good for old textile machinery as for the most modern equipment.

NON-FLUID OIL gives better—more positive lubrication—it clings to bearings—lasting longer than fluid oil. It minimizes the danger of bearings running dry, and becoming worn through excess friction. It reduces the labor of oiling.

Spoilage is cut off short—NON-FLUID OIL won't drip or spatter—like oil—meaning no more oil stained seconds to be sold at a discount.

Other advantages too—Just take the coupon route to better lubrication—fill out and mail and we'll answer promptly.

New York & New Jersey Lubricant Co.

401 Broadway New York

Sou. Agent LEWIS W. THOMASON, Charlotte, N. C.
Ample Stocks at Our Branches
Atlanta, Ga. Charlotte, N. C. New Orleans, La.

Tear out this page and mail with your

Name (Individual).....
Mill.....
Mill.....
Address.....
Will try on.....
(TYPE OF MACHINE)

C-221

The End of a Difficult Problem

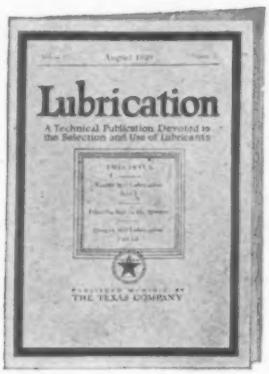
For a long time in a large number of mills, the successful lubrication of comb boxes has been a difficult problem. And for a peculiar reason.

And this was largely because so many textile mill engineers have been content to follow the custom—or the habit—of using a heavy lubricant in the boxes.

There was no real reason for this and we have demonstrated this conclusively with Texaco Comb Box Lubricant.

Now, as you know, a comb box contains an eccentric, and on some types of comb boxes, there are two, driving the comber shaft at a speed of 1500 to 2200 r.p.m.—a combined sliding and rotating movement.

These eccentrics run in a bath of lubricant and as the comb is usually set within 0.005 inches of the doffer cylinder, it is absolutely essential that the comb box, within which the eccentrics are located, be kept at an even temperature to maintain the exact adjustment of the comb from the doffer cylinder and the even running of the sliver. It is only by maintaining this distance exactly that the sliver runs even.



In this magazine we print month after month, articles covering the problems of lubrication as applied to various industries.

These articles are not theoretical, but based on practical operating experience.

We shall send "Lubrication" to Engineers, Executives, Buyers of Lubricants and others, who are professionally interested and who ask for it—FREE—for the time being. Write for it.

TEXACO COMB BOX LUBRICANT

shows what can be accomplished by engineers who are not content to follow the beaten path

Texaco Comb Box Lubricant is made especially for the purpose and meets operating conditions perfectly. It brings with it the freedom from mechanical difficulties in the comb box and because of its long life, is exceptionally economical.

Texaco Comb Box Lubricant is different from other products offered for sale or now in use, and to prove conclusively that it is adequate for the work, we have only to cite two points:

1. **One filling of Texaco Comb Box Lubricant lasts two or three times as long as the other kinds.**
2. **In every case we have shown that with Texaco Comb Box Lubricant there is a considerable reduction in frictional temperature in the box. Sometimes this difference exceeds 15 degrees.**

There is a Texaco Lubricant for Every Purpose

Other Texaco Textile Mill Lubricants are:

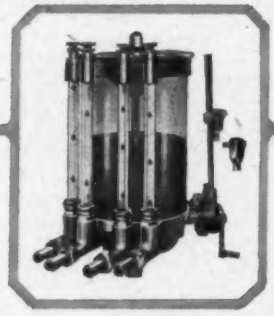
Texaco Loom Oil, Texaco Rabtex Spindle Oil, Texaco Top Roll Lubricant, Texaco Engine Oils, Texaco Machine Oils, Texaco Turbine Oils, Texaco Cylinder Oils, Texaco Gear Lubricants.

THE TEXAS COMPANY

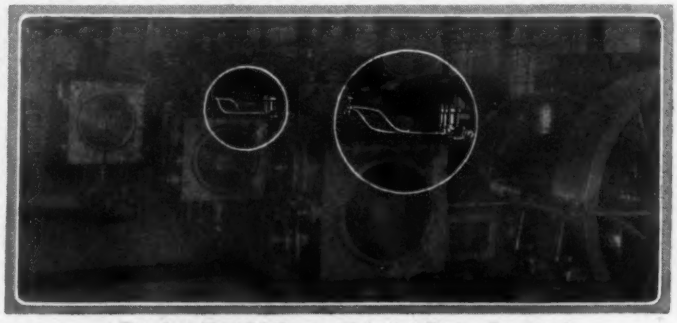
Dept., O, 17 Battery Place, New York City, N. Y.

Atlanta Houston Chicago

OFFICES IN PRINCIPAL CITIES.



Four-feed Hart Oil Pump



Two-feed Hart Oil Pumps lubricating Duplex Compound Engines manufactured by the American Engine Company

Reliable, Economical Lubrication Service

Every Hart Oil Pump is designed and constructed to maintain the high standards of quality and reliability characterizing all steam specialties built by the Sherwood Manufacturing Company.

Because it feeds the correct amount of oil and is economical—engineers everywhere are demanding the dependable lubrication service made a certainty with the Hart Oil Pump.

Every Hart Oil Pump, like other Sherwood Engineering Specialties, is distinguished by out-of-ordinary, individual features which result in reduced operation costs in the power plant.

Saving of time, fuel and man-power is the definite purpose of Sherwood products, which include injectors, ejectors, flue cleaners—a complete line of power plant equipment ranging from fusible plugs to grease cups.

Have you received a copy of the Sherwood Book? It is well worth reading.

Write your name and address on the margin of this page. Forward it to us, and we will send the Sherwood Book to you by return mail.

SHERWOOD MANUFACTURING COMPANY

BRASS FOUNDERS AND FINISHERS

Sole Manufacturers of Sherwood Engineering Specialties

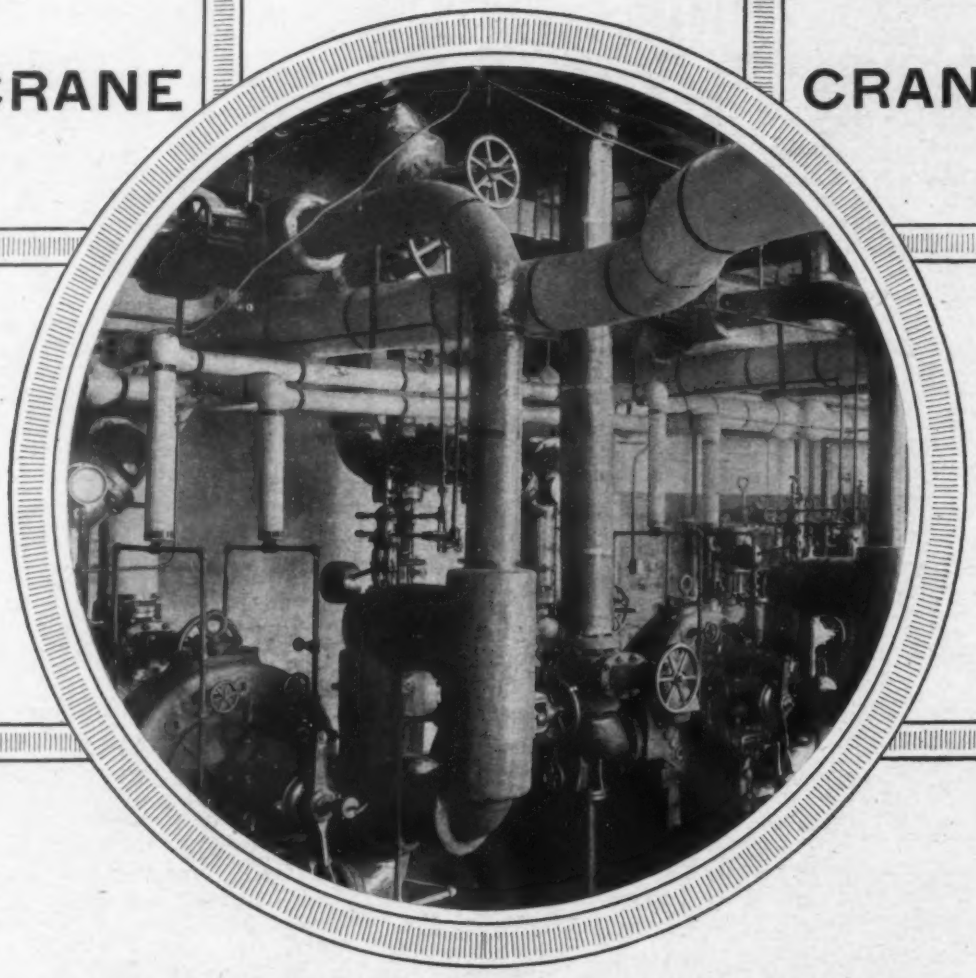
BUFFALO, N. Y. (3)

SHERWOOD

BUFFALO - N.Y. - U.S.A.

CRANE

CRANE



CRANE POWER PLANT EQUIPMENT

includes all the necessary valves, fittings and piping to take care of the various conditions of high pressure superheated steam and high or low pressure saturated steam.

SALES OFFICES, WAREHOUSES AND SHOWROOMS:

BOSTON, SPRINGFIELD, HARTFORD, BRIDGEPORT, ROCHESTER, NEW YORK, ALBANY, BROOKLYN, PHILADELPHIA, READING, ATLANTIC CITY, NEWARK, CAMDEN, BALTIMORE, WASHINGTON, SYRACUSE, BUFFALO, SAVANNAH, ATLANTA, KNOXVILLE, BIRMINGHAM, MOBILE, MEMPHIS, MUSKOGEE, TULSA, OKLAHOMA CITY, WICHITA, ST. LOUIS, KANSAS CITY, TERRE HAUTE, CINCINNATI, INDIANAPOLIS, DETROIT

FOUNDED BY R. T. CRANE, 1855

CRANE CO.

836 S. MICHIGAN AVE.

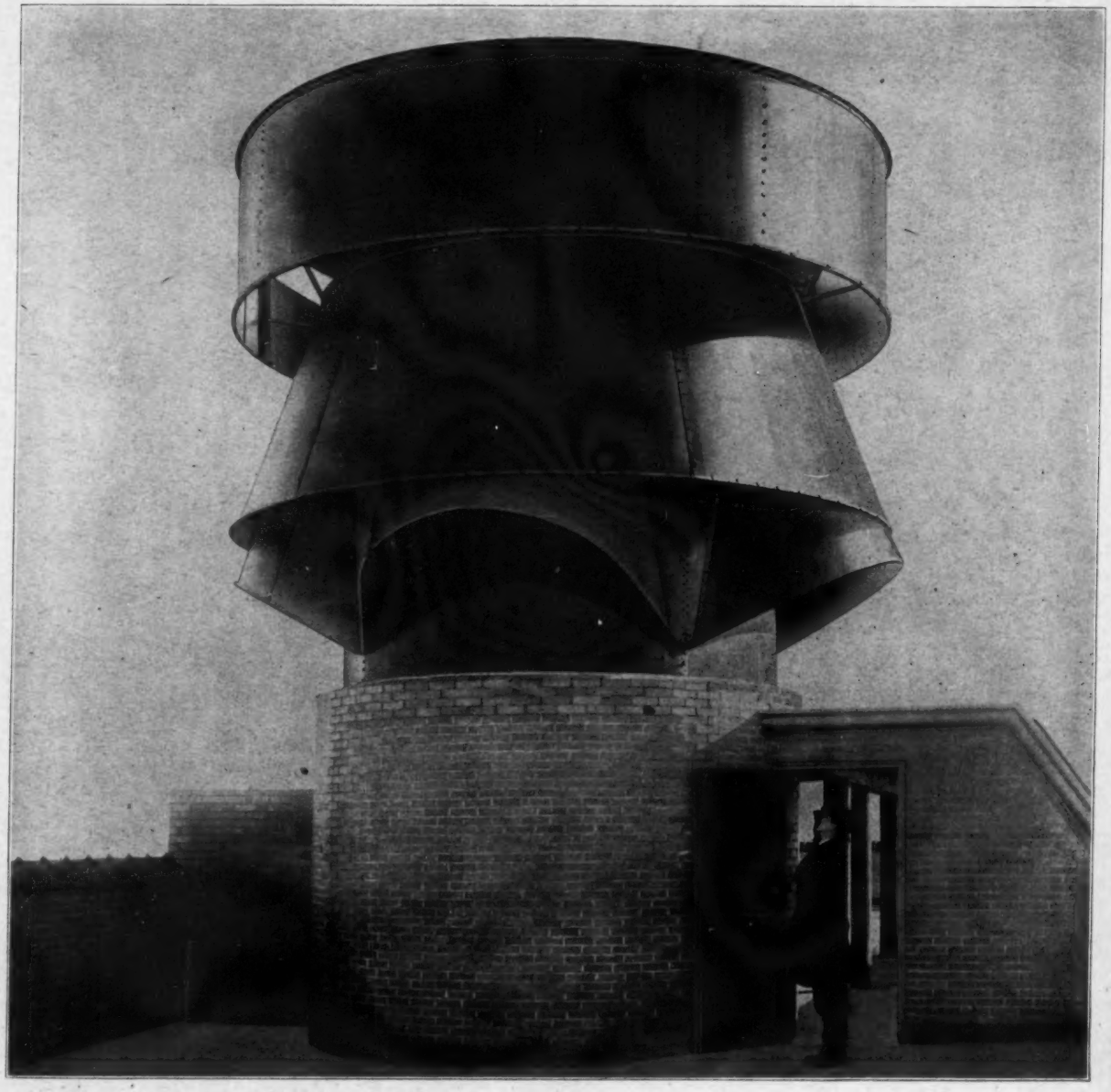
CHICAGO

WORKS: CHICAGO AND BRIDGEPORT

CHICAGO, ROCKFORD, OSHKOSH, GRAND RAPIDS, DAVENPORT, DES MOINES, OMAHA, SIOUX CITY, ST. PAUL, LITTLE ROCK, MINNEAPOLIS, WINONA, DULUTH, FARGO, WATERTOWN, ABERDEEN, GREAT FALLS, BILLINGS, SPOKANE, SEATTLE, TACOMA, PORTLAND, POCATELLO, SALT LAKE CITY, OGDEN, SACRAMENTO, OAKLAND, SAN FRANCISCO, LOS ANGELES

CRANE LIMITED — MONTREAL, TORONTO, VANCOUVER, WINNIPEG, LONDON, ENG., SYDNEY, N. S. W., QUEBEC, HALIFAX, OTTAWA, REGINA, CALGARY.

We are manufacturers of about 20,000 articles, including valves, pipe fittings and steam specialties, made of brass, iron, ferrosteel, cast steel and forged steel, in all sizes, for all pressures and all purposes, and are distributors of pipe, heating and plumbing materials.



The Largest Ventilator in the World

Its Dimensions are:

Neck—144 inches or 12 feet in Diameter Height—216 inches or 18 feet high
Weight—6 tons or 12,000 pounds

THIS enormous Arex ventilates the entire **6-story St. Francis Hospital of Peoria, Illinois,** where it works 24 hours every day, silently and efficiently doing its work to the entire satisfaction of all the hospital authorities, patients, nurses and employees. Then stop to think—all this without the cost of a cent for operating or maintaining this monster. Isn't that a real recommendation? Nothing but an Arex could accomplish this great feat.

Architect	A. J. Moratz, Bloomington, Illinois
Contractor and Engineer	V. Jobst & Son, Peoria, Illinois
Sheet Metal Work	Rudolph J. Jobst, Peoria, Illinois

Arex Company, Conway Building, Chicago, Illinois

Luke Seawell, Representative, 422 Austell Building, Atlanta, Ga.

The Attractive Mill Village

is an important factor in securing labor.

THE tendency of the times is toward beauty—and it is universal. Formerly it was characteristic of the wealthy. Now it has found its way into the homes of all classes. The attractiveness of the home, its surroundings and the village as a whole, will play an important part in your labor problems of the future.

The interest of the mill demands *lasting qualities* in the construction of homes for its operatives.

Human nature demands *convenience* of arrangement.

Comfort is the inherent right of every human being.

Strictest *economy* at a time of high costs is highly essential in all construction.

All These—Beauty, Durability, Convenience, Comfort, Economy

are the principal features of

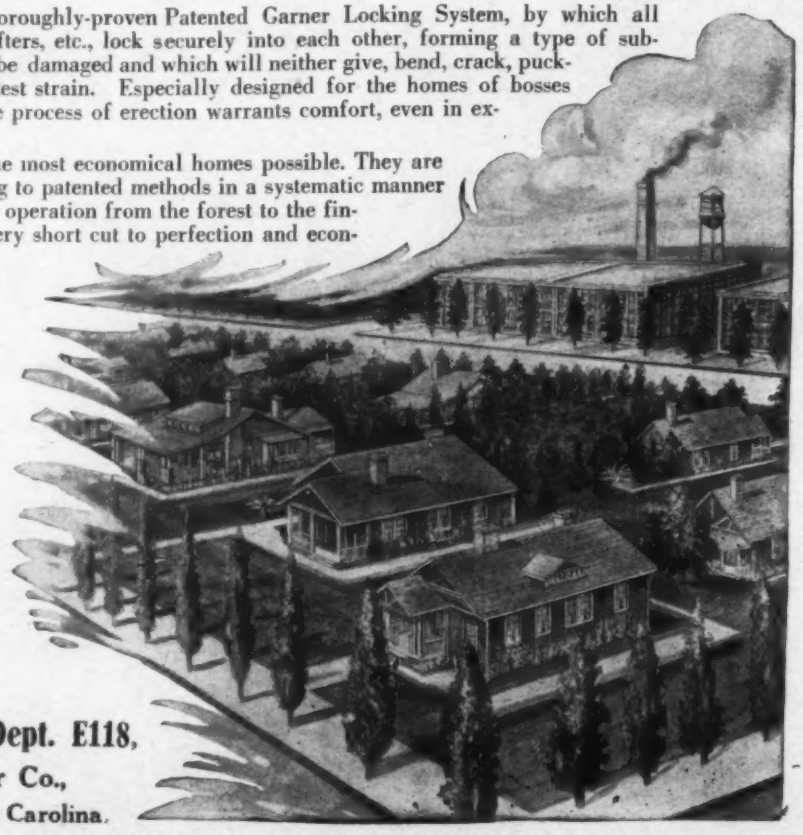
QUICKBILT BUNGALOWS

Snug, attractive, well-planned, artistic, roomy little bungalows especially designed for attractive, industrial villages.

Built after the practical, thoroughly-proven Patented Garner Locking System, by which all sleepers, joists, panels, plates, rafters, etc., lock securely into each other, forming a type of substantial home that cannot easly be damaged and which will neither give, bend, crack, pucker nor warp, even under the greatest strain. Especially designed for the homes of bosses or operatives. The doubly secure process of erection warrants comfort, even in extremes of hot or cold weather.

QUICKBILT Bungalows are the most economical homes possible. They are made in large quantities according to patented methods in a systematic manner by a plant which covers the entire operation from the forest to the finished house. As a result with every short cut to perfection and economy afforded the cost of manufacture is cut in half and all extra middle-men's profits and commissions are avoided. They are sold direct to you from the forest.

Arriving already built with nothing left but the erection, the labor usually necessary for construction is reduced to a minimum. There will be no piles of waste lumber left. Every waste in material, time, labor and money is avoided.



The Most Logical, Modern, Practical, Economical Method of Home Building.

For fuller explanation address

QUICKBILT Bungalow Dept. E118,

A. C. Tuxbury Lumber Co.,

Charleston, - - South Carolina.

ABERTHAW organization achieves success because it operates scientifically.

That means that work in process and work done are constantly undergoing statistical analysis and comparison with a view to the discovery of improved methods. It means, further, that the methods actually employed are the best that experience has yet devised: and that their proper application is assured by constant and careful supervision.

Built by ABERTHAW means built with understanding.

ABERTHAW
CONSTRUCTION COMPANY

BOSTON ATLANTA PHILADELPHIA BUFFALO

6-110

TUPELO
"TIPS"

Because

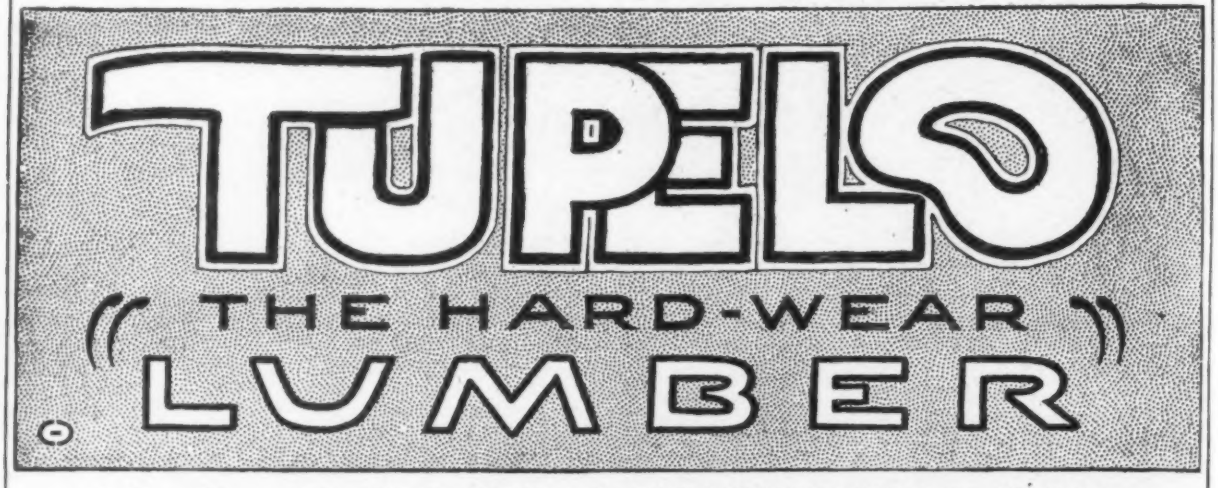
TUPELO IS A SOFT WOOD that "Wears Hard"

and because

TUPELO FLOORS GROW
SMOOTHER AS THEY GROW OLDER

and because

TUPELO HAS AN "INVOLVED" GRAIN—("KNITTED" or "WOVEN" TOGETHER)—which tends to prevent floors from "Slivering" or "Splintering"—for these and other reasons,



is largely used for FLOORING in *TEXTILE MILLS, WAREHOUSES* and for *PLATFORMS where heavy trucking is done.*

All of these are TOUGH TESTS for Tupelo—or any other lumber.

Ask us for the other "Straight Tips" on Tupelo, before you specify or place your order for FLOORING.

It's a big, worth-while subject and you should go to the bottom of it.

We'll go with you!

SOUTHERN CYPRESS MANUFACTURERS' ASSOCIATION

805 Perdido Building, New Orleans, La., or 805 Heard Building, Jacksonville, Florida

(Please address office nearest to you.)

"Lupton Steel Sash Lasts"

LUPTON Pivoted Factory Sash—Lupton Counterbalanced Sash—Pond Continuous Sash—all last indefinitely with ordinary paint protection.

They don't warp, don't shrink and rattle, don't swell and stick, don't decay. They are permanent.

The more highly skilled your workers, the more desirable it is to maintain their health and efficiency by adequate ventilation. And the greater is the need of maintaining permanently the "new" condition of the windows.

Superior durability is only one of the merits of Lupton Steel Sash Products. Moderate first cost is another. Ease of installation is a third.

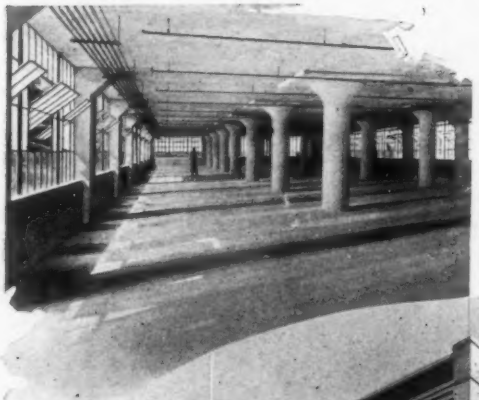
But their greatest merit is the fact that **they make better buildings possible.** At little or no higher unit cost they increase the investment value of the entire building, both by making it a better place to work in and by permitting wider floors and better layouts to be used.

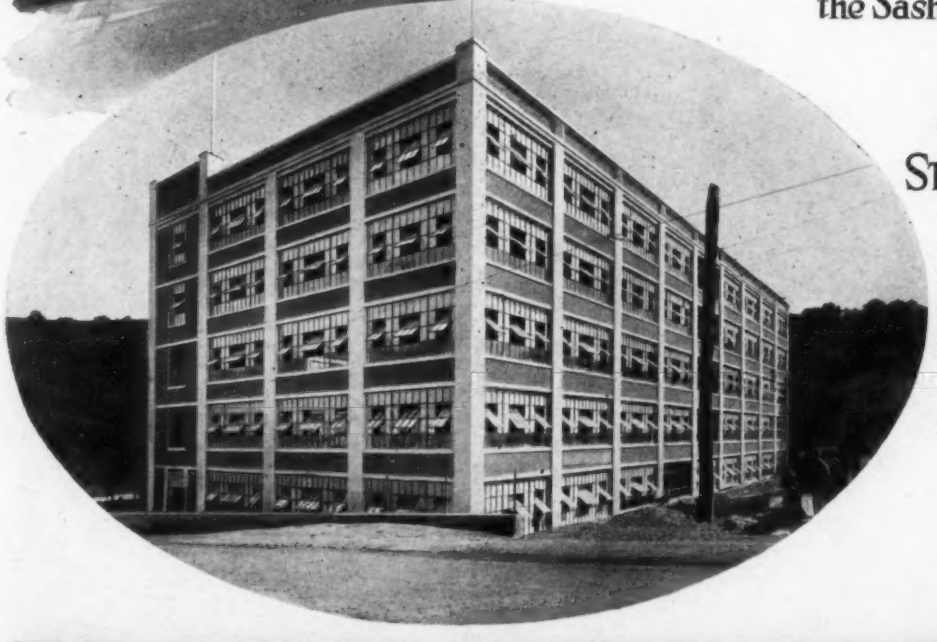
Our engineer salesmen in Baltimore and Atlanta, and our agents in other cities, will gladly advise you regarding the choice and proper application of Lupton Steel Sash Products to get maximum daylighting and ventilation results.

DAVID LUPTON'S SONS COMPANY

Amber St. & Allegheny Ave.	Philadelphia
1421 Munsey Building	Baltimore
1024 Candler Building	Atlanta

Daylighting and natural-ventilation equipment for maximum productio



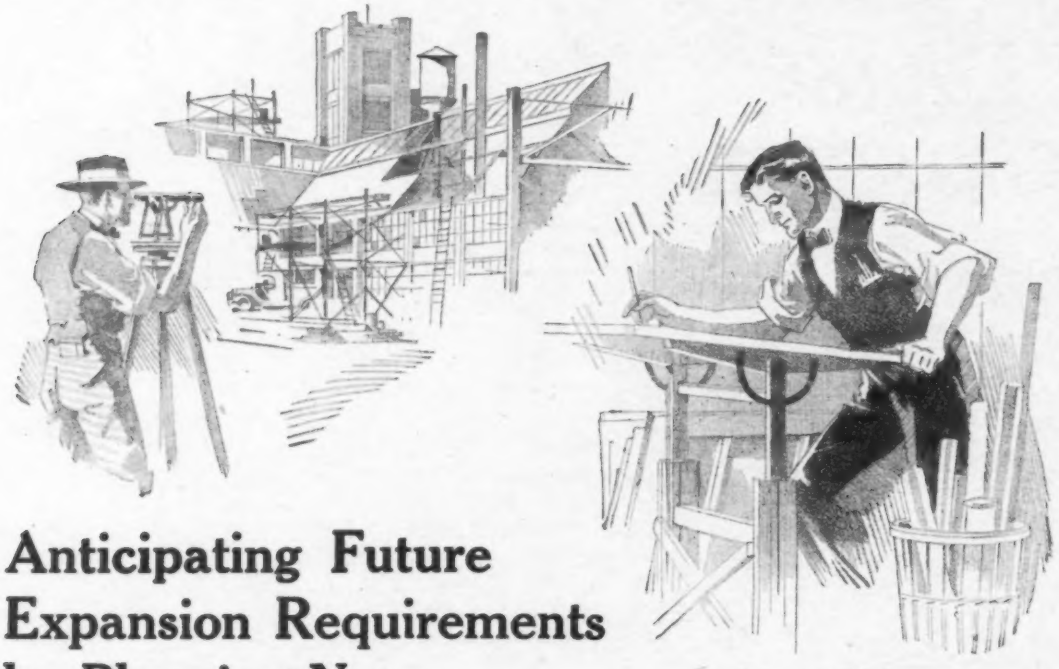


"Today —— the Sash makes the Factory"

Lupton
INVESTMENT VALUE
STEEL SASH PRODUCTS

Lupton Pivoted Factory Sash—*Cat. 10-LSS*
Lupton Counterbalanced Sash—*Cat. 10-LCB*
Lupton Steel Partitions and Doors—*Cat.-LSP*
Lupton Rolled Steel Skylight—*Cat. 10--Misc.*
Pond Continuous Sash for Pond Truss roofs, monitors, sawtooths and side walls—*Cat. 10-PCS*
Pond Operating Device for Long lines of sash—*Cat. 10-PCS*

THE FUNCTIONS OF THE ENGINEER



Anticipating Future Expansion Requirements by Planning Now

It is evident that the buying tide has turned in many industries and while it is far from the high point to which it must return, the time is ripe for the manufacturer to lay his plans for future growth.

By starting his Engineer now, his plans can be matured carefully and thoroughly. Then when the time has arrived for alterations, improvements or additions to his mill, factory or plant, everything will be ready for quick action.

This development of plans by his Engineer will give him a distinct advantage over competition when the growing market calls for expansion.

The longer in advance plans are made the more careful thought and study the manufacturer and his Engineer can devote to the problems that will confront him in the next few years.

Anticipating the future needs of industry is part of the task of the Engineer.

These phases of engineering as affecting several different fields are discussed in five booklets. Write for those of interest to you.

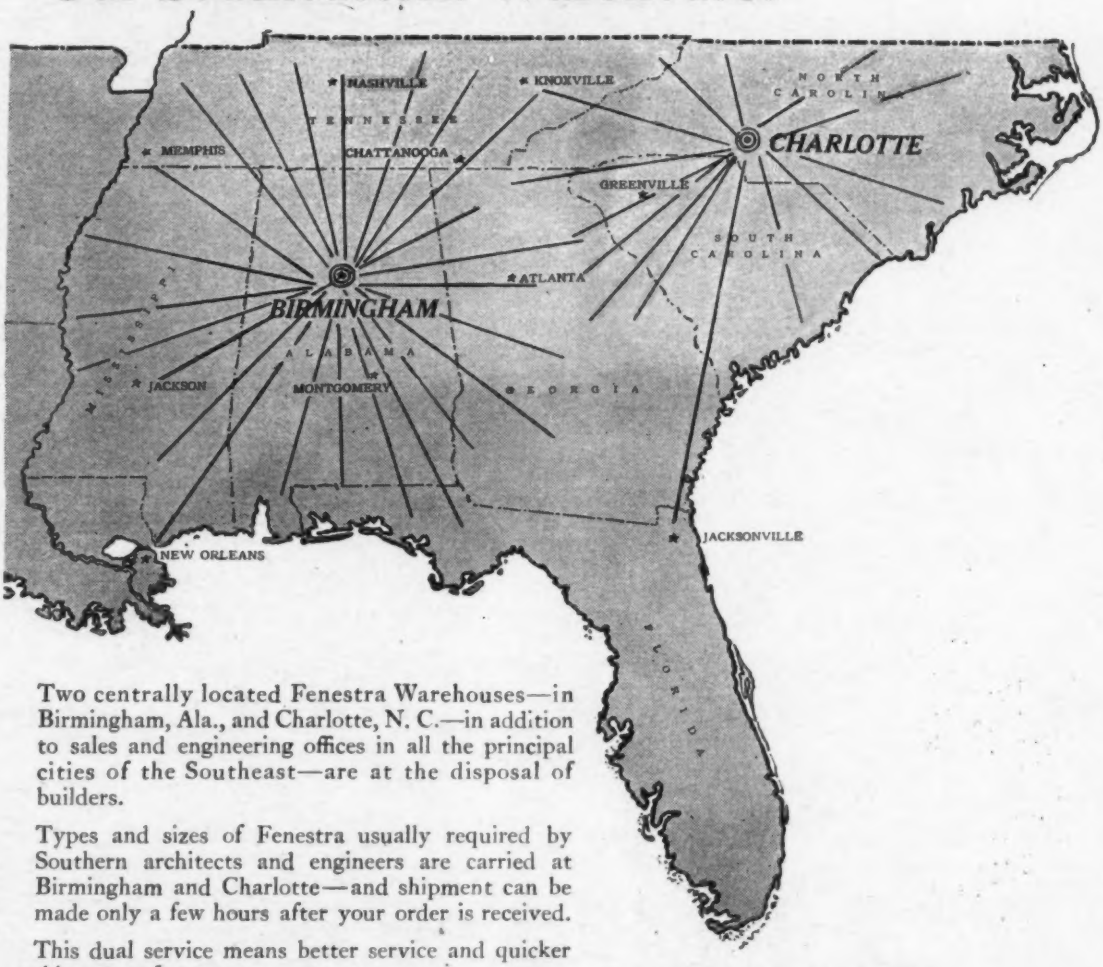
These booklets are: "Picks to the Minute," on the Textile industry; "Factories for the electric developments of all sizes; and "Examinations and Industrial Surveys," on the advantages of industrial housing operations; "Rivers in Harness," a discussion of hydro-electric developments of all sizes; and "Examinations and Industrial Surveys," on the important relation of valuation, and operation methods to the costs of production.

S SERVICE

J. E. SIRRINE & COMPANY
Engineers

GREENVILLE, SOUTH CAROLINA. FARM BUREAU BLDG., DALLAS, TEXAS, 331 MADISON AVE., NEW YORK

Take Advantage of Our Southeastern Warehouses



Two centrally located Fenestra Warehouses—in Birmingham, Ala., and Charlotte, N. C.—in addition to sales and engineering offices in all the principal cities of the Southeast—are at the disposal of builders.

Types and sizes of Fenestra usually required by Southern architects and engineers are carried at Birmingham and Charlotte—and shipment can be made only a few hours after your order is received.

This dual service means better service and quicker shipment—for you.

Take advantage of it—when you require quick shipment of steel sash.

Detroit Steel Products Company
4444 East Grand Boulevard, Detroit, Michigan

BIRMINGHAM WAREHOUSE
Detroit Steel Products Company
Southern District Office
BIRMINGHAM, ALABAMA

CHARLOTTE WAREHOUSE
Southern Engineering Company
501 Realty Building
CHARLOTTE, NORTH CAROLINA

Fenestra
STEEL WINDOWALLS

---- and at the Liggett & Meyers Co.

TROPICAL PAINTS

A Fact:

YOU'VE read how noted people at prominent places smoke "Fatimas". You've been convinced that "Chesterfields", tho mild, do—"satisfy".

Now read how noted concerns like the Liggett & Meyers Co. use Tropical Paint and Oil Co. products. Convince yourself that their high quality "satisfies" these men who know.

It's not surprising! Tropical products are the result of years of specialization in protective and decorative coatings for industrial uses. Special formulae have been perfected for every surface and condition. High ideals have maintained a constant and exceptional quality.

Let one of our specialists analyze your paint requirements. His suggestions will prove of value. It will not obligate you in any manner.

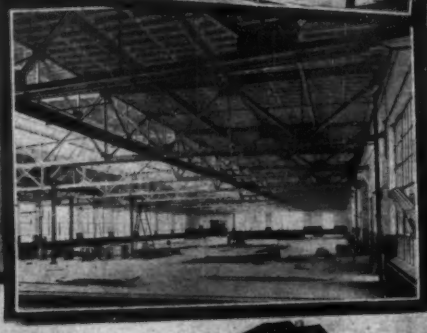
THE TROPICAL PAINT & OIL CO., CLEVELAND, O

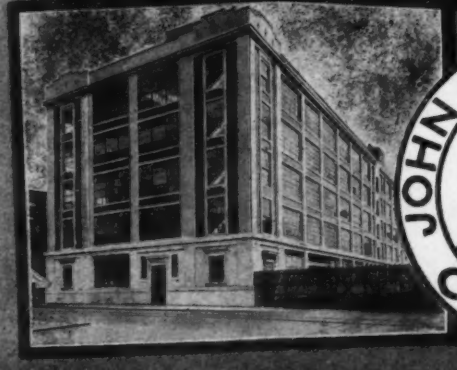
THE TROPICAL PAINT & OIL CO. CLEVELAND, O. U.S.A.

TROPICAL

Paints—Enamels—Roofing Materials

John W.
Ferguson
Company





NEW YORK BELTING & PACKING CO. FOUNDED 1846 INCORPORATED 1856

NEW YORK
BELTING & PACKING CO.

1899 brought the first contract from the New York Belting & Packing Co., of Passaic, N. J., to Ferguson. That was for a Storehouse, Machine Shop, and Coal Storage Building.

In 1917 more buildings were required—and, because of their earlier experience, the contract for a five-story, reinforced concrete building, 90 by 250 feet, was placed with Ferguson.

1919 saw the completion of another contract—making in all 502,640 square feet of floor area Ferguson has built for this concern.

The sole reason for 76% of Ferguson's business being "repeat orders" is that Ferguson Service satisfies clients from the start.

JOHN W. FERGUSON COMPANY
ENGINEERS & BUILDING CONTRACTORS
PATERSON N.J. NEW YORK N.Y.

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JOHN W. FERGUSON F COMPANY

ROBERT AND COMPANY

ARCHITECTS AND ENGINEERS
FOR
TEXTILE MILLS AND INDUSTRIAL PLANTS

ATLANTA

A few of our clients:

Standard Textile Products Co.
Cannon Mfg. Co.
Jenckes Spinning Co.
Thomaston Cotton Mills.
Bibb Manufacturing Co.
West Point Manufacturing Co.
Dunlop-America Limited.
Separk-Gray Interests.

Reinforced concrete buildings erected for Peerless Cotton Mills, Thomaston, Ga.—Algernon Blair, Montgomery, Cont'r.

--another one built with

CRUSHED **ENSLEY BASIC SLAG** SCREENED

BIRMINGHAM SLAG COMPANY

Branch Sales Office: Walton Bldg., ATLANTA, GA.
BIRMINGHAM, ALA. TWO PLANTS: ENSLEY, ALA.—ALABAMA CITY, ALA.
Branch Sales Office: Williams Bldg., THOMASVILLE, GA.

OJACO

MILL·WHITE

MANY a trial balance has been delayed for days because in the dim light, an 8 looked like a 6 or a 6 like a 9. Many a contract and many an order has been placed at an incorrect price because the stenographer, transcribing her notes, has failed to see an error and the man who signs the letters has likewise overlooked it.

If OJACO Mill White can make the sun do double duty in factory and shop, it certainly can do as much in the office. The sun's rays are reflected from OJACO Mill Whitened wall and ceilings in a softened glow from which the glare is removed.

Call this the preface to the story and let one of our representatives tell you the rest. Write, wire or phone.

OLIVER JOHNSON & CO., Inc.,
Paint Makers
Providence, R. I.

DISTRIBUTORS: Cowles & Bleckley, Atlanta, Ga.; Charlotte Supply Co., Charlotte, N. C.; B. A. Cook Co., Fitchburg, Mass.; J. B. Farnum Co., Woonsocket, R. I.; Alexander Grant's Sons Co., Syracuse, N. Y.; Wm. F. Harticon, Fall River, Mass.; Lewis E. Tracy Co., Boston, Mass.; F. P. Van Hosen Co., Rochester, N. Y.; M. F. Bragdon Paint Co., Portland, Me.; Dwelle-Kaiser Co., Buffalo, N. Y.; American Hard Wall Plaster Co., Utica, N. Y.

The Light Meter Tells The Story

Confidence

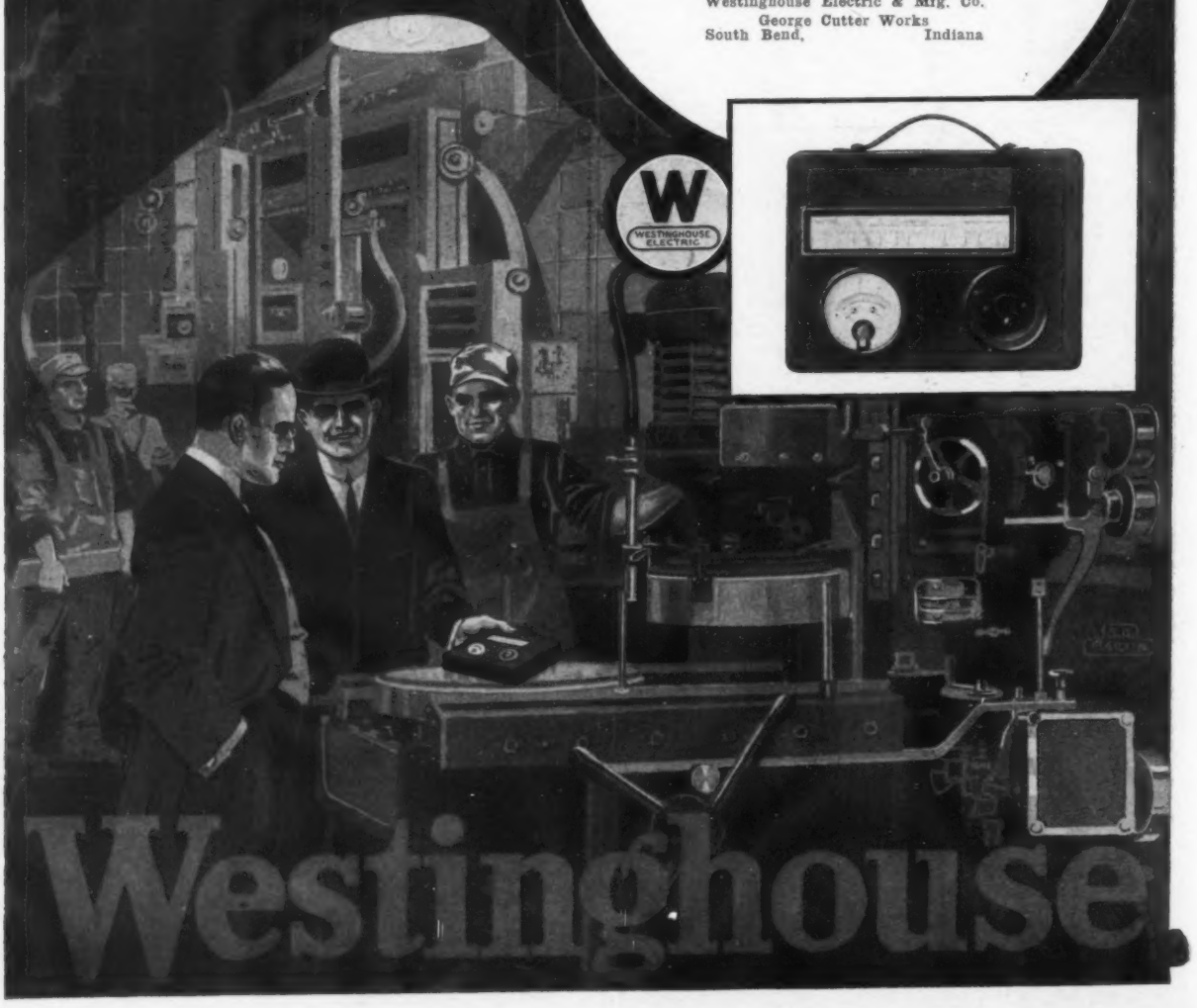
Is assured when you are sure that labor costs and scrapping are at the minimum.

Through experience efficient values of lighting have been determined—almost standardized—for most manufacturing operations. The Foot-Candle Meter positively indicates whether the lighting is up to standard. Have you put this light meter on the job in maintaining your lighting at productive values? It's a positive measure, as definite and simple as a foot-rule.

If you are not sure the lighting in your plant is right, call on our Illuminating Engineering Bureau. They will analyze the condition and report. A representative is stationed in all large cities. His services are gladly given for the asking.

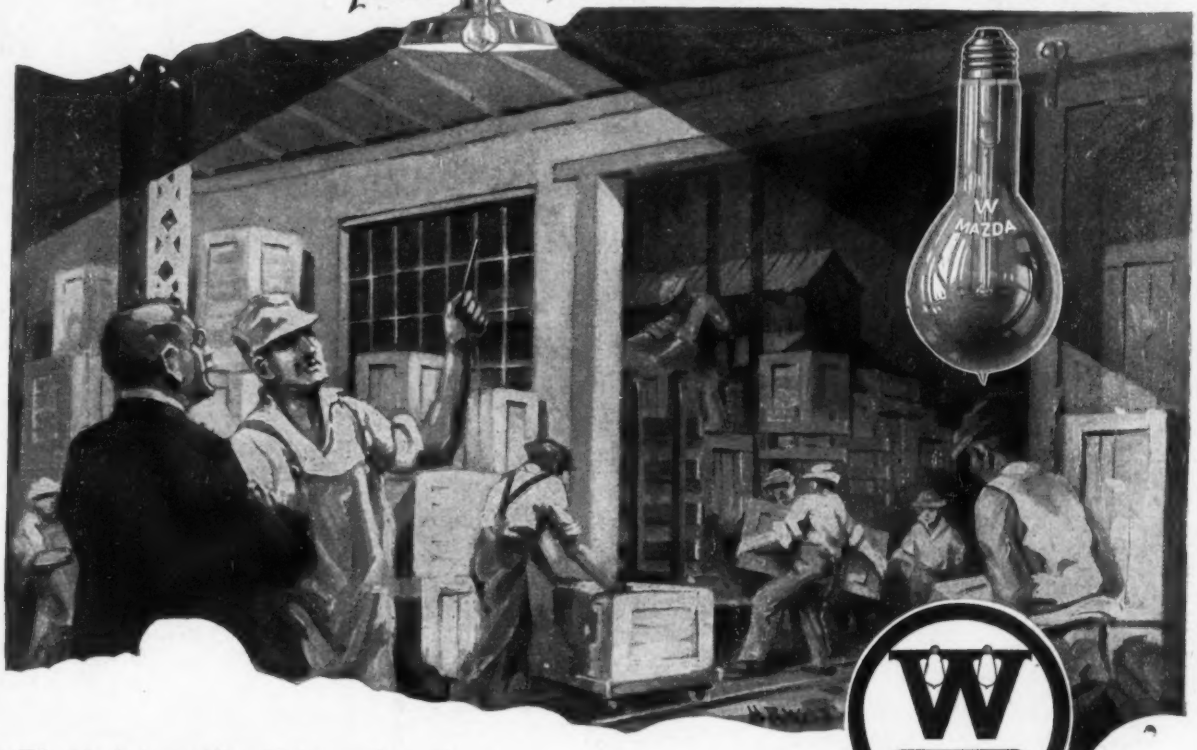
Write the Westinghouse Dealer in your territory, the nearest Westinghouse office, or—

Illuminat'ng Engineering Bureau
Westinghouse Electric & Mfg. Co.
George Cutter Works
South Bend, Indiana

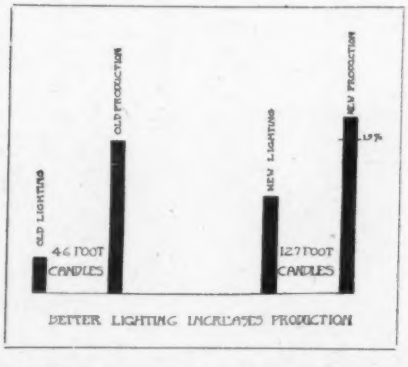


Westinghouse

"Chief, Those Big Lamps certainly put the 'Prod' in Production."



"That's interesting if true, Sam."
"It's both Sir, as you will see from this chart."



"Under the old system we got only a little over four foot candles. But after we installed those big Westinghouse Lamps and Cutter Reflectors, we pushed our lighting up to over twelve, and increased production fifteen percent."

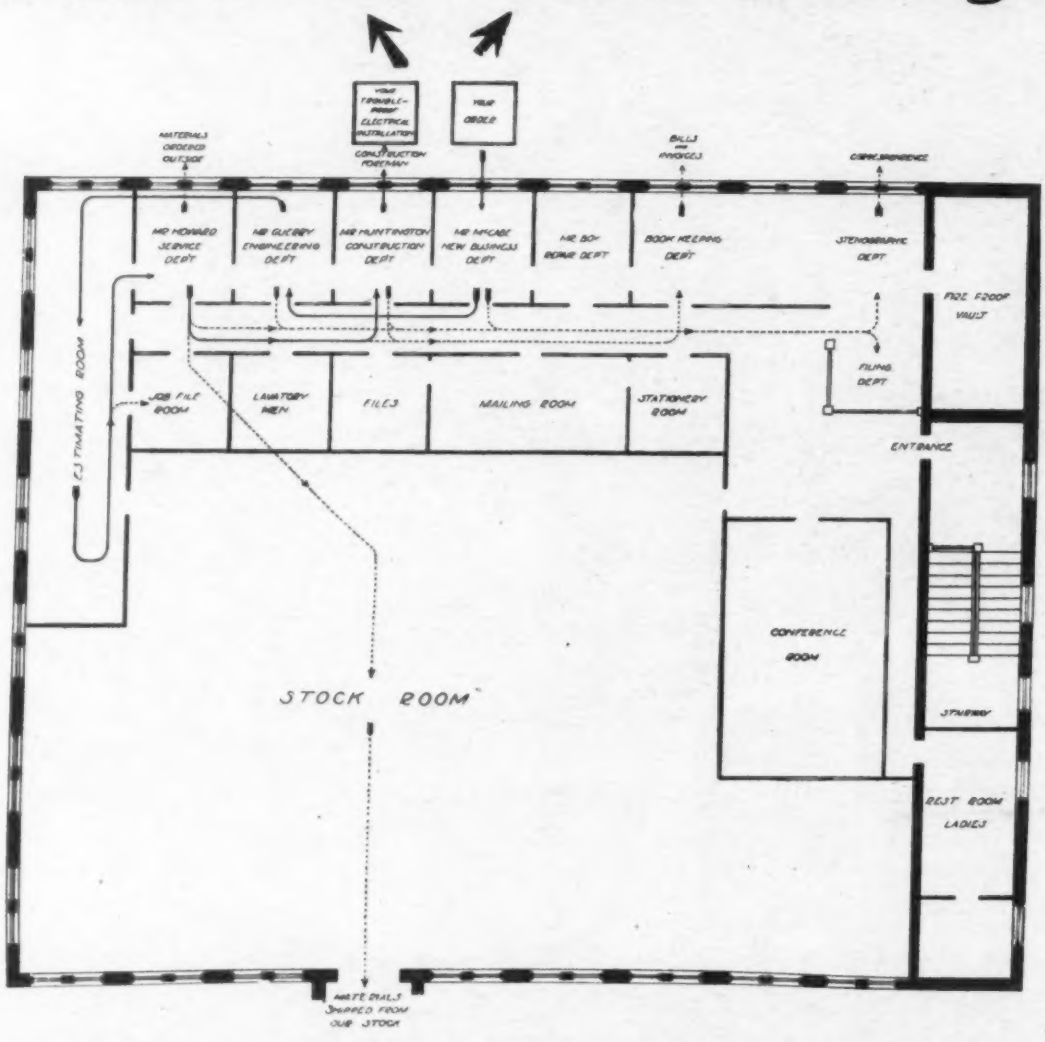
"Good work, Sam; but tell me—whose idea is this?"

"The Chart?" Partly mine, partly the engineers of the

WESTINGHOUSE LAMP CO.
165 Broadway **New York City**
Sales Offices and Warehouses Throughout the Country
For Canada—Canadian Westinghouse Company, Ltd., Hamilton, Canada

Westinghouse

Follow Your Order Through!



This Diagram of the Second Floor of Our Building Shows

THE ORGANIZATION BEHIND

Huntington & Guerry "Trouble Proof"

Electrical Installations for Industrial Plants

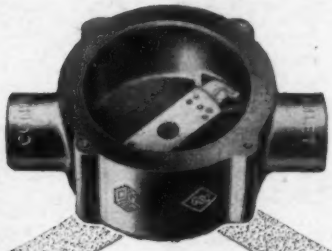
A PLANT—AN ORGANIZATION—A STOCK
AT YOUR COMMAND
FOR BETTER ELECTRICAL INSTALLATION SERVICE

Greenville, South Carolina

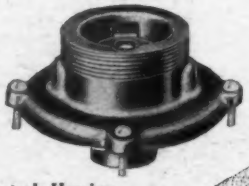
CONDULETS

Watertight Hub Cover

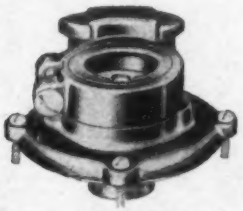
GSC Condulet body



Blank Cover Watertight



Plug Receptacle Housing threaded without brass cap



Plug Receptacle Housing with spring door non-watertight

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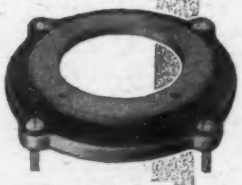
Bulletin 1000-M describes these Condulets. Ask also for complete Catalog of Condulets.

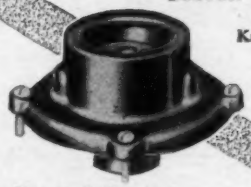


Lamp Receptacle Cover watertight

Switch Cover Watertight

Fuse Block

Plug Receptacle Housing, with brass cap, watertight



Plug Receptacle Housing without spring door

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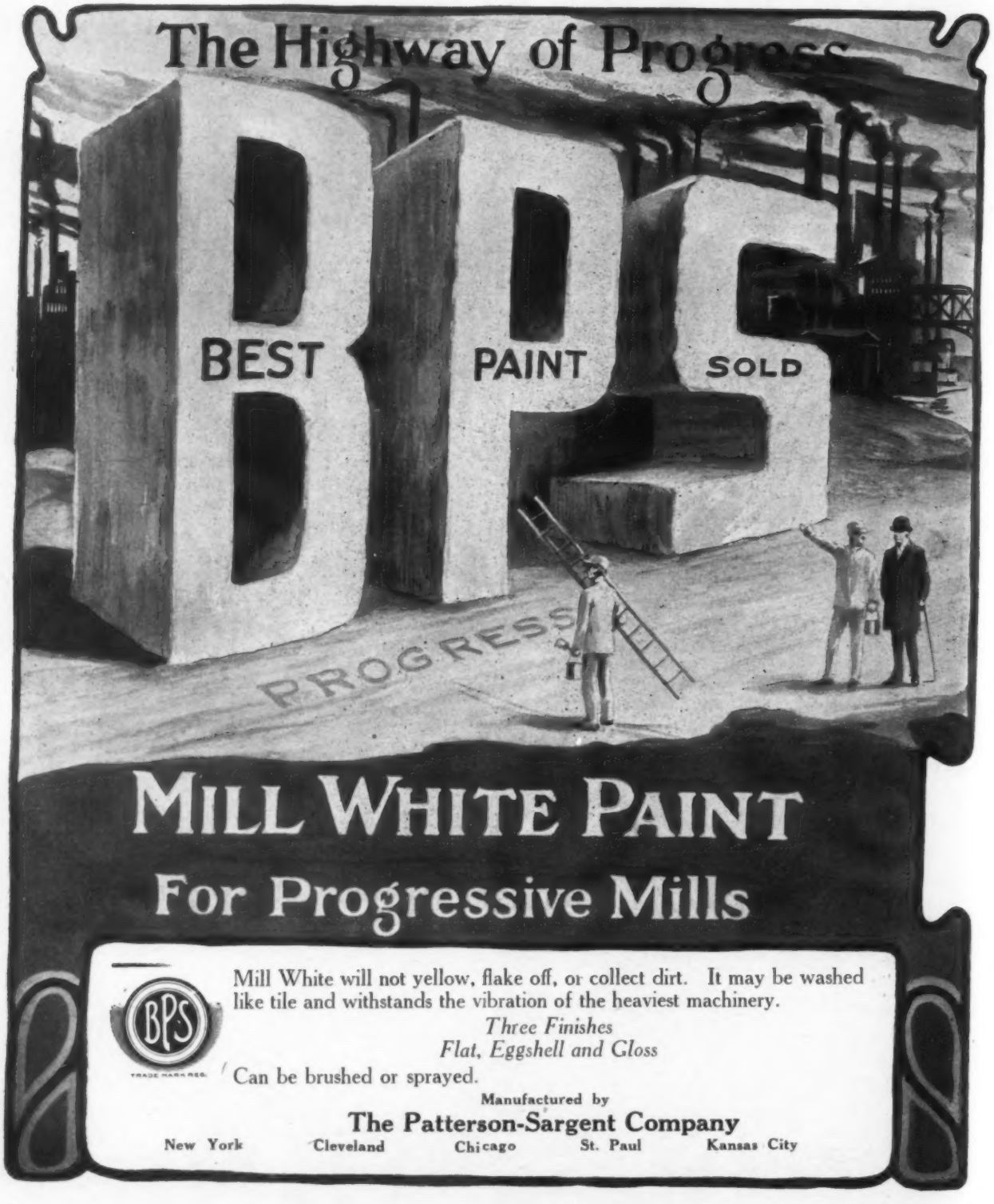
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CONTENTS

EDITORIAL—

Congressmen, Ltd. 251

"Financial Violence" 252

Federal Tax Laws 252

GENERAL AND TECHNICAL—

The Cotton Industry in North China 253

Lowering Speeds to Increase Production 257

The Practical Technic of Mule-Spinning 259

Business Profits Versus Comparative Cost Records 262

Spinners Meet at Spartanburg 266

Income Tax Laws and Regulations 273

Soap 275

What the Southern Mills are Doing 281

The New England Mill Situation 283

Cotton Comment 287

World Cotton Conference 287

Notes About Men You Know 288

HOW OTHER MEN MANAGE—

A Twisting-In Record 291

Picking Operatives 292

Improving the Opener Hopper 292

Points on Towel Finishing 295

Dirty Floors and Fires 297

Cotton Ducks 297

Taking Out Twist on Fine Speeders 299

Setting the Warp Line and Drop Wire Box 301

Khaki Goods 303

Some Knitting Questions Answered 303

Twist on the Fly Frame 303

An Oiling Kink for Twisters 305

D. E. Trask Talks on Efficiency 305

Notes About Men You Know 309

Southern Products Show 309

KNITTING SECTION—

Union Garments 313

Knitters Meet at Charlotte 318

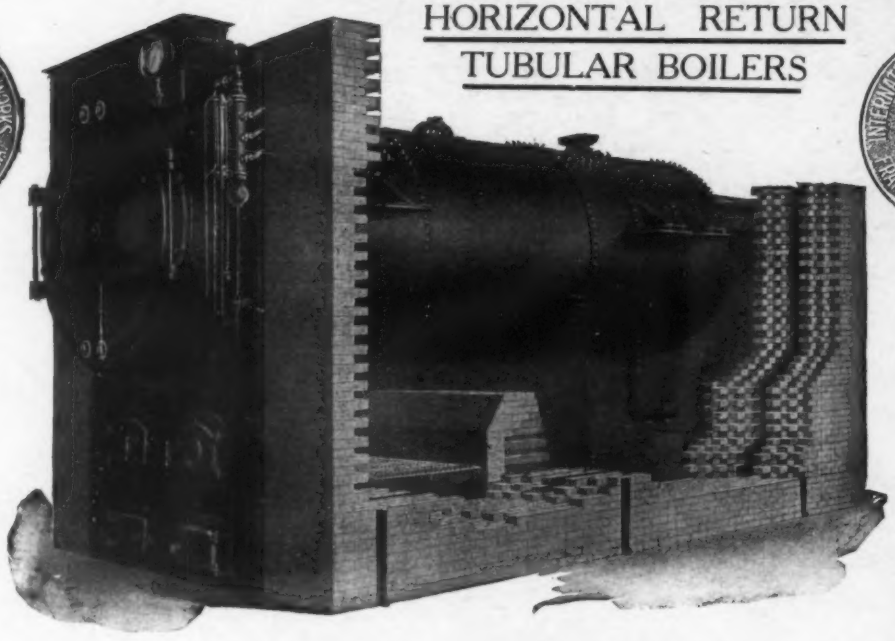
The Knit Goods Market 321

Let Us Go Forward! 325

Among the Knitting Mills 327

The Yarn Market 328

HORIZONTAL RETURN TUBULAR BOILERS



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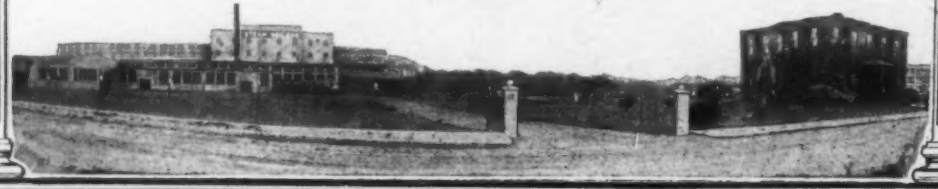


With the Publishers—

Some Genuine Optimism

By WOOD RAINWATER

Of the Rainwater Bank, Morrillton, Arkansas, In "Commerce and Finance" for Jan. 5, 1921

His horse went dead and his mule went lame,
And he lost his cow in a poker game,
And a cyclone came on a winter day
And blew his house where he lived, away—
Then an earthquake came and when that was done,
It swallowed the ground that his house stood on,
Then the tax collector, he came around—
And charged him up with the hole in the ground.

If you've had harder luck than this friend of mine, we will present you with a 12-months' ready-made living.

We have searched the papers to find out who stopped this war, or started our cotton down hill. We like the dream days of 1919. The *Arkansas Methodist* writer says—our trouble, "We forgot God, and besides tried to skin Him out of His share of our prosperity."

Another author says: "What you sow you reap." "The way of the trangressor is hard." But think how blessed we are.

We live in a free country where a fellow can do as he pleases, so you don't break the law (or get caught).

Persimmons, pecans, hickory nuts and acorns grow wild for winter food. If these are troublesome to find anybody will give you a beef cow for a load of wood or one-half day's work.

Dewberries and poke salad grow early in spring, blackberries in summer. Besides, everybody has kin folks in Oklahoma or Texas. Go visit them between seasons.

Fellow says, what's become of the money?

There is more money and credits than the world has ever known before. Last year there was $54.00 cash for every man, woman and child in the United States. This year there is $59.00. Every day in Morrilton farmers sell about $10,000 worth of cotton. They deposit a little in bank, pay some on debts, trade a little and take half of it back home—to spend later, I guess.

Most of our customers have plenty of corn and meat. Besides, the eight hours you sleep, you are as well off as Rockefeller—the eight hours you work you are as happy as Pierpont Morgan. The eight hours you loaf, eat and play, you are as happy as Woodrow Wilson. Besides, money won't buy red whiskey, and most of us don't care for clothes, and we wouldn't swap one ear or one eye for a wagon load of dollars. So money is a very poor thing to base our happiness on. Hard times make better citizens of us.

As long as a fellow has health, if he loses money some years that's not bad. If a man never had a loss it wouldn't be any pleasure to win. If you knew the day you were going to die you wouldn't have any fun living.

Every fellow thinks he has the hardest time. We have food, clothing and can worship our Creator if we wish. There is one guaranteed rule for happiness, peace and plenty. The Bible tells you how you can get it. If you are not interested, that's your trouble. What a man sows he reaps, says the Good Book, and it's true.

Be man enough to take your medicine without kicking. There is plenty of good years to come. If waiting for them is a horrible dread, a nickel's worth of Paris green will take you to a country where it don't snow nor have any cotton market. Come on, buck up and be a He man. Go after what you mostly desire—wealth, pleasure or happiness. They say there is a Creator who will assist you. You might try Him and see if it's so.

What do I think of cotton? If we reduce next year's acreage one-half or more—raise a good living at home—keep out of debt and keep this year's crop till we get a decent price, I think we are very sensible and all right.

The Government of the United States says it's time to work for a living instead of borrowing it. I believe in the Government.

Missouri farmers raise and sell more chickens and eggs than all the products of Arkansas' farms. We'd better buy some of those educated hens.

I've given advice (fine advice, I think) for ten years and made one convert; that's encouraging.

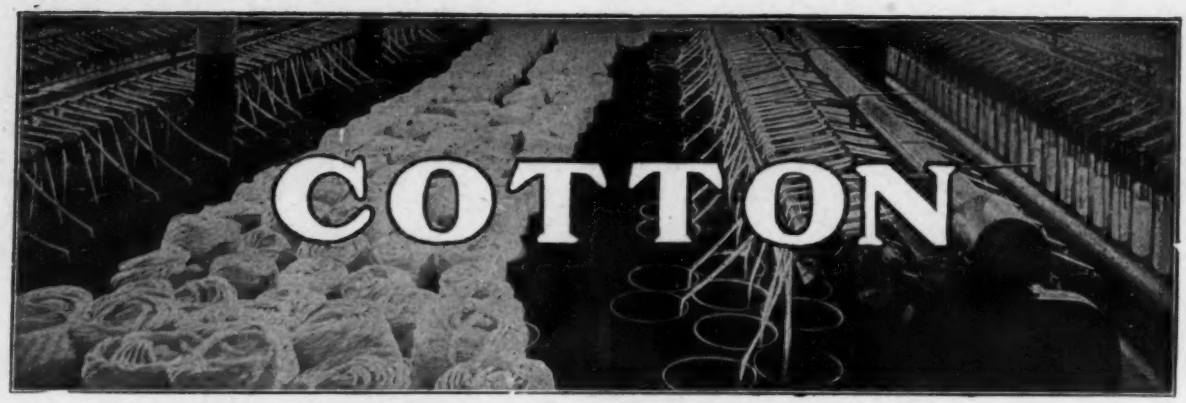
All of us have more property than we had in 1914, or we had more fun, or owned a Ford. So if we die early we had a good time for one year, anyway. So what's the difference?

AMONG COTTON'S READERS

James F. MacEnroe
Assistant Treasurer and Manager Ware Shoals (South Carolina) Manufacturing Company

"I have been a reader of COTTON for many years and must say it is one of the few textile magazines that I read and enjoy from one cover to the other. Every issue is full of interest to a man in the textile game."

Jas. F. MacEnroe



February, Nineteen-Twenty-One

Congressmen, Ltd.

Another month of Congressional conversation has solved but little of the great problems that confront us. Except from the standpoint of the calendar, we are no nearer peace than we were in 1920. The appropriation bills have been cut deeply below the departmental estimates, but in too many cases this is only a pretended economy and deficiency bills will be presented later to make up the deficits that now are itemized as savings.

In the important problem of taxation, of tariff, of readjustment, of unemployment and of foreign relations, another month of words at Washington brought us little that was constructive and nothing that was new. Neither in the debates of Congress, nor in the labors of its Committees, nor in the efforts of the executive departments is there to be found a record of real achievement in the transaction of the nation's business. The routine operations of collecting and spending money have been attended to in a routine way. But that is all.

Nor is that unusual. It is the end of an administration at Washington. The Democratic party is going out and the Republican party comes in. A Republican Congress that is out of agreement—almost out of touch—with a Democratic president and a Democratic Administration could hardly be expected to accomplish much. It has lived up to that expectation. It probably will do so during the month that is left. There will be an increase of oratory in the days that will precede March 4, but the increasing tendency to filibuster will make the length of the debates assume a growing disproportion to the work that actually will be achieved. Here and there a minor measure may become a law, but outside the appropriation bills, there is little likelihood that any statutes worth the while will be added to the law books of the nation or that President Wilson will get writers' cramp trying to keep up with the Congressional demand for his autographs on bills upon which both houses can agree.

There has been much talk about a budget system for Uncle Sam's billions but its actual inauguration will be up to President Harding's administration. The appropriation bills upon which the present Congress is working are intended to care for the departmental needs of money until July 1, 1922, so that the real work of putting the country on a scientific system of collecting and spending money is pretty far in the future. But the theorists have talked of budget reforms for the Federal Government ever since Alexander Hamilton's days. So anything that resembles a concrete conversion of these theories into facts should be listed as an achievement.

One thing seems unchangeable in the human mind. That is the habit of looking to the Government for help in time of trouble. Probably the war was responsible for much of the feeling that the Government should cure everything from warts to falling prices. It doubtless dates back much farther than that. It seems, however, to be more emphatically a national disease than ever. No pleas for economy can stop it. The fact that Governmental aid is probably the most expensive in the world only serves to stimulate the demand. Good roads and good schools, extensions of credits to keep up prices, Government assistance to sell to the bankrupt nations of Europe, Government funds for the exploitation of this or that local development—it seems so easy to solve our little problems by calling upon Uncle Sam for help. And if we can interest constituents of enough members of Congress to swamp the latter with letters and resolutions, we may at least have the satisfaction of watching Congress spend days of precious time debating our demands.

It is not fair to put all the blame on Congress. Congress is our national virtue. It is the Congressmen that are our national fault. They go to Washington as representatives of limited constituencies. It is not exactly right to complain because they make the representation of that constituency, or their hope of re-election by it, the first object in their official life. The Congressman from Massachusetts can not be blamed because the vote or the voice of a precinct in Boston looms larger to him than the demand of the whole sovereign state of Georgia, or an appeal from the great but distant Northwest. The Georgia Representatives reciprocate this most heartily when Georgian interests are at stake and the members from North Dakota are equally deaf to the pleas of Massachusetts or Georgia when the prairies demand something from the Government of the United States. Congressmen are but human, though some more so, and the latter are usually re-elected most frequently and by the most comfortable majorities.

There is not the slightest prospect that the Sixty-Seventh Congress will be different, or that it will be animated by less selfish principles or higher motives. Its members will follow the time-honored plan of resolving all questions into local issues and thundering out their

"ayes" and "noes" accordingly. This tendency will be emphasized by the visible lack of leaders of high rank in either party. The war made the White House so preponderant in national questions that Congress was relegated decisively into second place. It has not recovered its independence. President Harding may be less firm—or less obstinate, if that pleases you better—about being both motorman and conductor as well as chairman of the board and treasurer of the company. But there is no present guarantee that he intends to leave too much to Congressional initiative. A few Senators and fewer Representatives have talked about reasserting legislative independence, but most of these budding independents are the same men who subscribed most cheerfully and with least show of resistance to the Wilson hegemony. It will be refreshing, of course, to note an occasional refusal of Congress to bow to the White House will, but the signs of rebellion are few and even these promise to vanish "in the interest of harmony."

As a former Senator, President-elect Harding has promised to be careful not to trespass on Congressional prerogatives. But that was before he was confronted by the actual temptations to run things that are part of the order of the day for the Chief Executive of a great nation. If precedents count for anything, he will find that the machine runs much more smoothly if he holds a tight rein than if he trusts to Congress to tell where the procession of State ought to go. This will be particularly true until something more definite in the way of Congressional leadership has developed. In neither house—and in neither party, for that matter—is there a surplus of leaders who have both the willingness and the ability to assume statesmanlike responsibilities for great measures. As for the rank and file in both houses, they would much prefer to follow the White House views to having to map out their own course. Then, if their constituents complain, they can hide behind the declaration that they "supported the President."

Years ago, in a conflict with President Roosevelt, Uncle Joe Cannon referred to these as "Congressmen who have angle worms where their spinal columns ought to be." But Roosevelt won. So did President Wilson. So will President Harding if it comes to a test.

"Financial Violence."

On November 15, 1920, the Federal Reserve Bank of New York issued a circular to member banks announcing that "all banks of the State of North Carolina are now on the par list."

When the bankers of North Carolina read the circular, they called a meeting of the Bankers' Protective Association of North Carolina to discuss means for preventing the enforcement of these plans of the Federal Reserve System. As a result of the meeting an appeal was made to the State Legislature and the National Congress for relief.

It is not within the province of COTTON to discuss the technical details of banking practice, but in reading the resolution adopted at this meeting one important fact would seem to need investigation and explanation.

It seems evident from Section 6 of the resolution that the Bankers' Association feels that this ruling is in favor of the manufacturers, merchants, catalog houses and banks in the large centers and unfavorable to the small town banker. Further, in the preamble of the resolution, with reference to forcing banks to accept par clearance, the Association says in Section D.:

"Such action would prove of great expense to said Federal Reserve Bank, conclusively showing it to be not for the purpose of making collection in an orderly and economical way, but to use a species of *financial violence* for coercing the performance without charge of a valuable service said Federal Reserve Bank cannot secure by legal and orderly means." (Italics are ours.)

In the January number some comment was made on a plan recently adopted at Memphis by the Chamber of Commerce, the Cotton Exchange and the Clearing House Association to form a south-wide organization for forcing a reduction of one-third in the cotton acreage to be planted in 1921. Compliance with the reduction plan is to be enforced through credit restrictions and by denial of credit to any planter, farmer, supply merchant or land owner who refuses to join in the movement. The banker's pledge reads as follows:

"I, ----------, president, vice-president, cashier of----------Bank of----------, do hereby heartily agree to the plan to reduce the 1921 cotton production as adopted at the Memphis Cotton Convention held Dec. 7-8.

"In furtherance of the purpose of said plan I hereby agree and solemnly promise that I will confine credit extension to farmers and merchants subscribing to the said plan and pledging themselves to such acreage reduction, denying credit facilities to all others refusing to so pledge their support.

"I hereby further agree to assist in the thorough organization of my county and will use my influence to make the movement a success."

Name of Bank.

By----------

Official Capacity.

Witness----------

It will be noted that the power to exert *"financial violence"* in this instance is in the hands of the small town banker.

As already indicated we are not versed in banking technic but we are wondering whether or not in the two examples cited there is a distinction without a difference.

Will some banker please define "financial violence?"

Federal Tax Laws.

Problems which face the business man, the individual and firms and corporations in the preparation of income tax returns are solved in the latest edition of the book "Practical Questions and Answers on the Federal Tax Laws," just issued by the Irving National Bank.

The book consists of 96 pages and has been prepared by experts on the interpretation of tax legislation. It covers in question-and-answer form a wide range of cases which arise in the making of returns. It also contains a digest of the laws covering the capital stock tax, estate taxes, stamp taxes, occupational taxes, public facilities taxes, the excise tax, taxes on beverages, tobacco and amusements—in fact all Federal tax laws now in force affecting individuals, partnerships and corporations, except the tariff law, the tax on distilled spirits and certain revenue laws of limited application and long standing.

The edition is based on the United States Statutes and Treasury rulings as of January 2, this year. Special provisions applying only to 1918 and 1919 have been eliminated.

The Cotton Industry in North China

BY BEN Y. LEE.

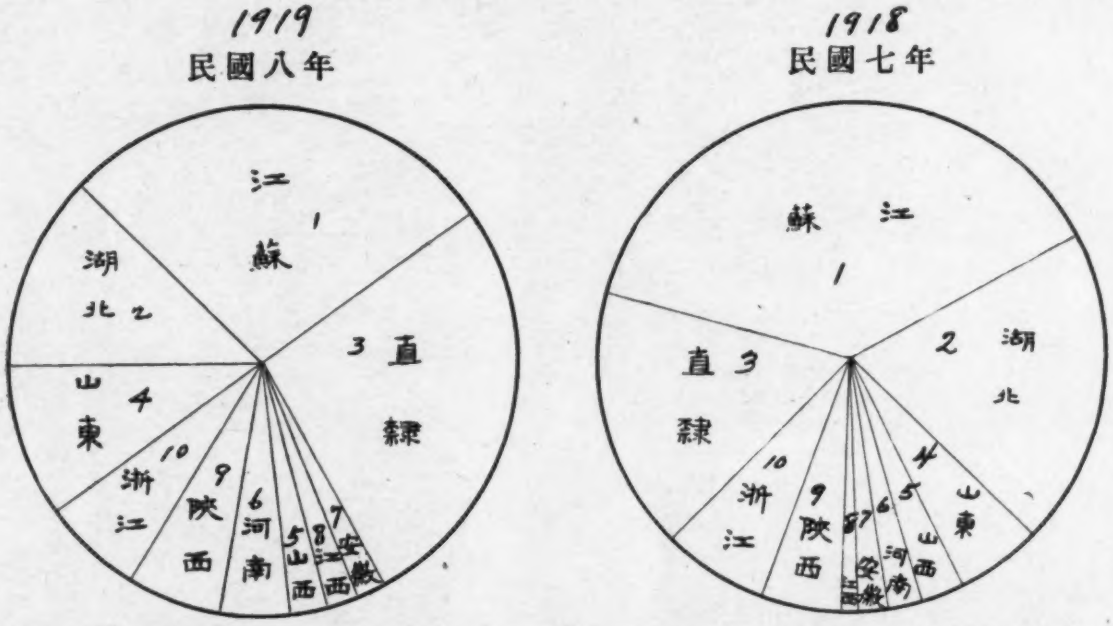
BUREAU FOR THE IMPROVEMENT OF THE COTTON INDUSTRY, TIENTSIN.

Tientsin is a great cotton mill and cotton distributing center in the North of China as is Shanghai in the South. The former ranks second in China, next to Shanghai, as a great cotton manufacturing center and is a new field for this industry, while the latter is known as the greatest textile center in the Orient. The rapid development in the textile industry since last year is very significant, indicating that in a few years to come this city is to have a half million spindles and thousands of looms. Let us see what are the most important factors which have contributed to its success!

Tientsin, of all the treaty ports, has the great advantage of being located so near Peking as to be almost a part of the capital of China. The distance between these two cities is only eighty miles and they are connected by railway. It is situated on the coast in the Province of Chihli, about 750 miles north of Shanghai. The business opportunities of the city are based on the fact that it is the outlet for a vast hinterland consisting of the richest provinces of North China and extending into Mongolia, and that its good communications by land, rail and water have made it also a distributing center for a constantly growing volume of imports. It is the great distributing point in the North for foreign goods as well as a collection depot for goods to be shipped abroad. Animal products and cotton form its chief exports.

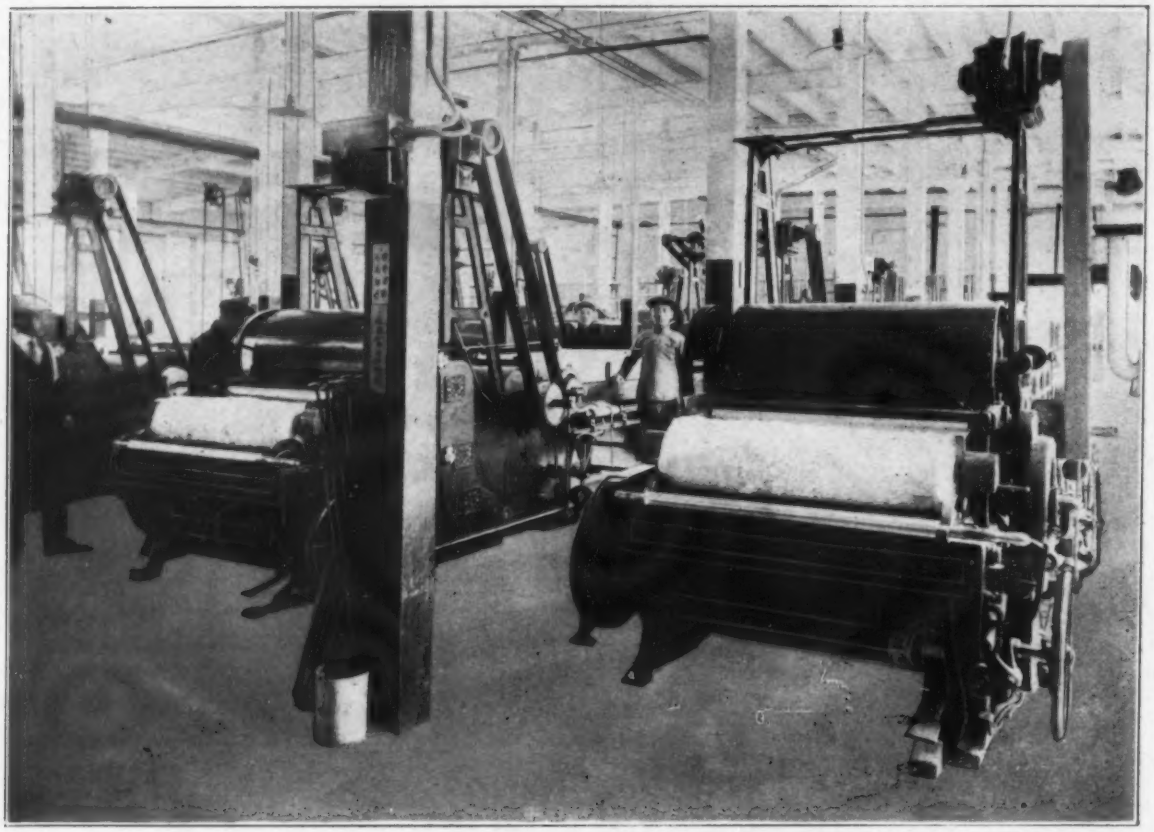
The cotton that is grown in the north provinces is shipped from Tientsin. The staple most nearly resembles Peruvian cotton and is of fairly good color, but is short and wiry. Some is being exported to Japan, where it is used for stuffing kimonos and other garments, and to the United States, where it is mixed with wool in the manufacture of blankets. Owing to the fact that it is well adapted to the latter purpose, the United States is one of the best purchasers of this grade. Exportation of such cotton increased from 442,000 to 572,000 piculs last year. Cotton cultivation, on the whole, has not been so successful in North China as in the Yangtse provinces, because the season is shorter, frosts are earlier, and the soil is not so rich as in the latter. Great increases in production and improvement of various methods in raising cotton have been carried on extensively during the past few years as many new mills are being established which cause a demand for improvement in both its quality and its quantity.

Previous to 1900, very little cotton had been grown in the North and in the neighborhood of Tientsin. In 1902, however, records show that there were more than 70,000 pounds exported to foreign countries and to other ports in China. During the last ten years, cotton exported from Tientsin had grown enormously. Since 1910, the annual export of cotton from Tientsin varied from 50



A CHART SHOWING THE PERCENTAGES OF COTTON GROWN BY THE DIFFERENT PROVINCES. THE TABLE BELOW GIVES THE FIGURES AND THE NUMBERS IN THE FIRST COLUMN ARE FOR REFERENCE TO THE CHART.

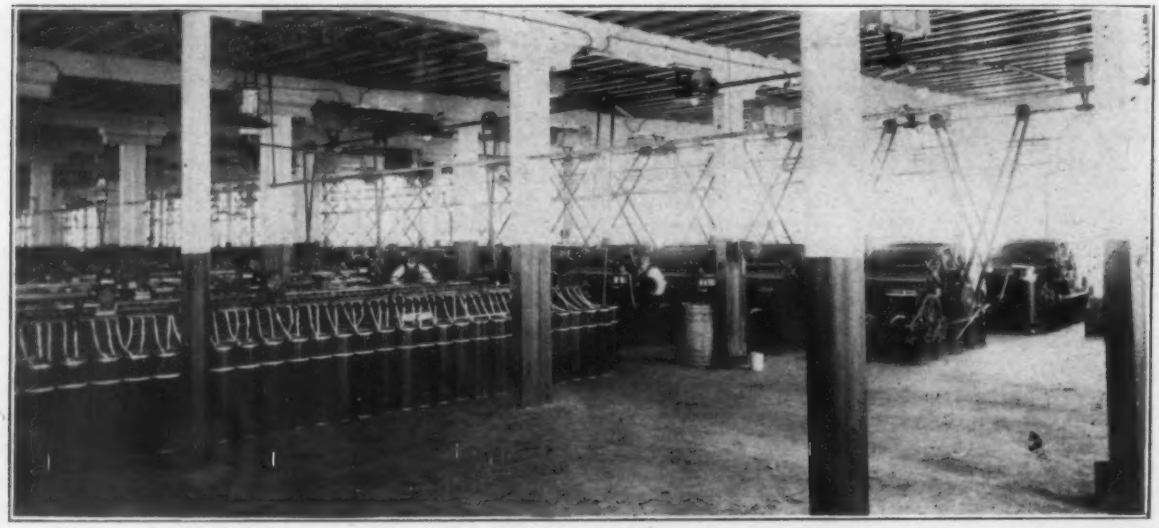
		1918	1919			1918	1919
1	Kiangsu	35.70	28.54	6	Honan	2.63	2.04
2	Hupeh	20.41	12.71	7	Anhwei	2.10	1.30
3	Chihlie	18.15	27.72	8	Kiangsi	0.91	1.35
4	Shantung	6.23	9.24	9	Shensi	5.19	6.20
5	Shansi	2.32	4.42	10	Chekiang	6.26	6.41



IN THE PICKER DEPARTMENT AT THE YU YUEN TEXTILE COMPANY, TIENTSIN.

million pounds to 100 million pounds. There are many principal factors that have stimulated cotton production as follows: The substitution of the cotton plant for the opium cultivation which had been prohibited by the Government; the organizing of the Chinese Millowners' Association and various organs for promoting the new industry in various places by establishing different cotton experimental stations; a better demand from abroad, especially from Japan; the successful efforts of the dealers to stop the practice of watering the cotton; and lastly the high price of cotton during the last few years.

According to the opinion of an American cotton expert, the soil in the Province of Chihli is suitable for American seeds and the results from those experimented with have proven very satisfactory in Tangshan, about 80 miles north of Tientsin, and elsewhere. On account of scanty rainfall in this province, the farmers employ various methods of irrigation, such as digging wells and ponds, etc. Each mow yields about 130 to 140 catties, 40 per cent of which is lint cotton. (One mow equals one sixth of an acre, and



ONE OF THE CARD ROOMS AT THE YU YUEN TEXTILE COMPANY, TIENTSIN, CHINA.

a catty equals 1 1/3 pounds.) Cotton produced in this province is enough to supply the local mills and the peoples' need and the rest is for export to various ports.

The following table gives the amount of cotton grown in the north provinces as well as the others:

Name of Province.	1918 (One picul equals 133 1/3 pounds.)	1918
Chihli	2,099,381 piculs	2,683,786 piculs
Shangtung	720,787 piculs	894,558 piculs
Shansi	304,322 piculs	292,851 piculs
Shensi	680,000 piculs*	720,000 piculs*
Honan	266,162 piculs	427,030 piculs
Kiangsu	4,128,696 piculs	2,763,160 piculs
Hupeh	2,370,170 piculs	1,231,000 piculs
Anhwei	243,012 piculs	125,533 piculs
Chekiang	724,000 piculs	620,000 piculs
Kiangsi	105,000 piculs	131,250 piculs
Total	11,143,530 piculs	9,799,000 piculs

*Approximately.

From these figures we can readily see that the increase of cotton production in the northern provinces, namely, Chihli, Shantung, Shansi, Shensi and Honan, is becoming very rapid. In 1918 these five northern provinces produced only 34 per cent of the cotton among these ten main cotton growing provinces; in 1919, the percentage had been increased to 50 per cent, and the amount of cotton grown has been increased from four million piculs in 1918 to nearly five million piculs in 1919. The Province of Chihli has become the second largest cotton growing province, next to Kiangsu, and it is predicted that in a few years to come this province will rank first in China as a cotton growing province.

The increase in the number of cotton mills in these provinces has been developed in parallel with that of cotton growing. Before 1914 there was not a single cotton mill in the North but now there are more than a dozen scattered over these provinces. Particularly in Tientsin the development has been rapid. The following table gives the number of mills in Tientsin including those now under construction.

Name of Mill	Year Established	Spindles	Looms	Maker
Heng Yuen (old unit)	1914	5,000		H. & B.
	1920	5,000		H. & B.
Heng Yuen (new unit)	1920	20,000	300*	Saco-Lowell
Yu Yuen	1917-18	70,000	500*	Saco-Lowell
Wah Sing	1917-19	25,000		Saco-Lowell
Yu Ta	(Under Construction)	35,000		Saco-Lowell
Pao Cheng No. 3	(Under Construction)	50,000		Saco-Lowell
Pei Yang	(Under Construction)	25,000		Saco-Lowell
Wei Yu	(Proposed)	20,000		
Model Mill	(Under Construction)	10,000		Fales & Jenks
A Japanese Mill	(Proposed)	(Unknown)		

*All looms in this list were made by Crompton & Knowles.

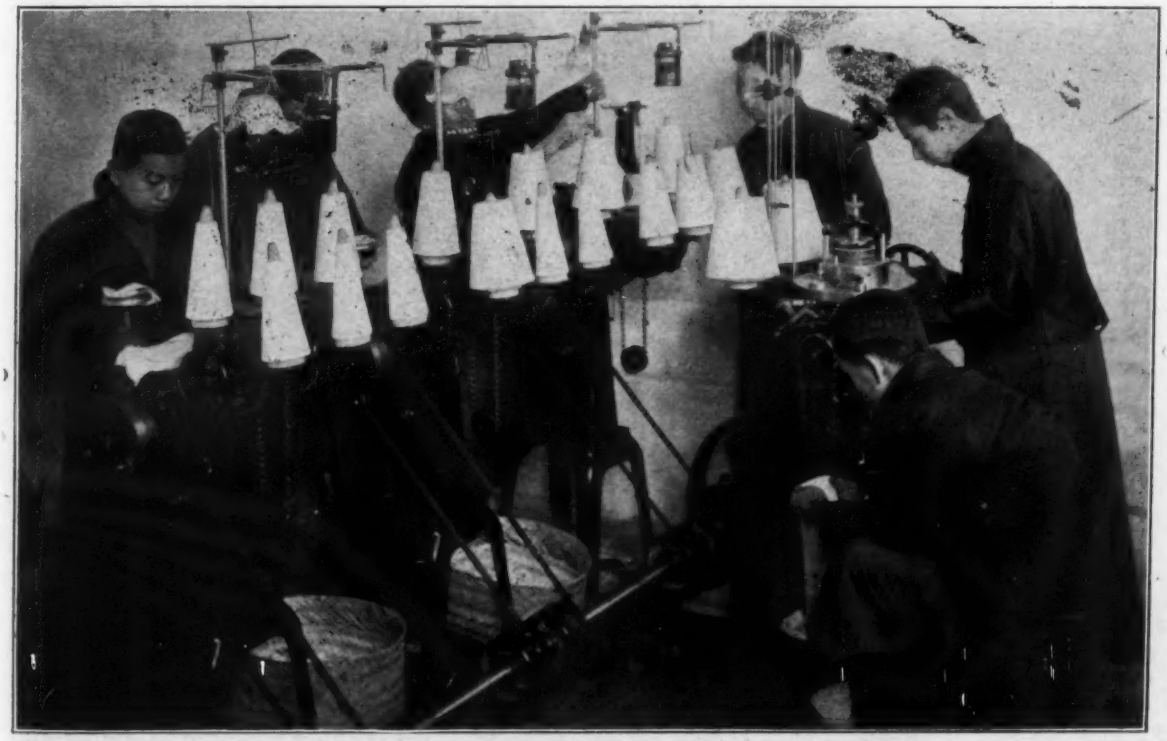
Other new mills either proposed or under construction in various northern provinces are as follows:

Name of Mill	Year Erected	Spindles	Looms	Maker
Unnamed Mill (Mukden)	(Proposed)	10,000	300	Saco-Lowell
Lu Foong Mill (Tsinan, Shangtung)	1918	15,000		H. & B.
Wah Sing Mill (Tsingtau, Shangtung)	1919-20	15,000		Whitin
Wah Sing Mill (Tangshan, Chili)	(Under Construction	15,000		Hetherington

There are several other proposed new mills, 10,000, 12,000 and 15,000 spindles respectively, to be located in Shensi and Honan provinces and the machinery makers are to be either British or Saco-Lowell. Besides, there is a Japanese mill in Tsingtau, Shangtung.

Nearly every cotton mill in the North, particularly those in Tientsin, is or has been financed and proposed by high officials or ex-officials. In this respect the difference of management and the way the business is conducted is clearly seen between them and those in Shanghai and elsewhere in China; the latter being managed or conducted mostly by business men. In many Tientsin mills, the big share holders are not known in public. For this and many other reasons, the public often "guess" a certain mill, A or B, is financed by Japanese. Among all these mills in Tientsin, the Pei Yang Mill is the only exception to the general rule, that is financed by Chinese yarn dealers of Tientsin and the rest are either directly or indirectly financed by officials.

The wages and salaries paid in the Tientsin mills are



A CORNER IN THE PLANT OF THE NORTH CHINA KNITTING MILLS CO., LTD.

about ten per cent or more higher than in Shanghai. All head mechanics and their chief assistants are imported from Shanghai and elsewhere and hence they demand higher wages than prevalent where they come from. Some of the salaried men also come from Shanghai and some are local men who are more or less connected with high officials. The industry is new and many high officials in mills are not thoroughly acquainted with the principles of mill management which is regarded as inferior to that in Shanghai mills. There is not so much competition here as there are fewer mills, besides there is no foreign managed mill of any nationality. Without considering the term efficiency, any mill would have made enormous profit if it were under honest management.

Now let us consider one of the most prosperous mills in Tientsin, or rather in the North, namely, the Yu Yuen Textile Company.

This mill was organized and constructed in 1917 and was under operation in 1918 with 25,000 spindles. The promoters are officials and the mill has been financed practically by a few whose names are not published in public. During the succeeding two years enormous profit has been made and with that profit the second extension of 25,000 spindles has been added in 1920 and the third extension of 20,000 spindles and 500 looms will be added in 1921. Thus with the total of 70,000 spindles and 500 looms, it becomes the largest mill in the North and the second largest in China among the Chinese mills. The factors that have contributed to its success are one-man-power, honesty and efficiency on the part of the manager. The mill employs practically all young men, called apprentices, from 12 years of age up, with a few women employees. Lodging and food are provided free to the apprentices and the mechanics' families. Tenement "rooms" are built of one story near the mill for all operatives. The daily production is considerably higher than in many Chinese mills, over one pound of 16s yarn being produced per spindle in a so-called 24 hour work day. Not a single operative employed is under 12 years of age, but this is a rare case. Piece work is being adopted as every spinning frame and roving frame is equipped with a clock. Social service is being practiced as every one is satisfied with his work and also with his pay. The manager, being trained in a European school, has developed many welfare features for the employees. Pool rooms, mill school, lecturing system, reading room, etc., are provided. In fact there seems somewhat like a Y. M. C. A. within the mill. Such a spirit is rarely found in China. Besides all this good feeling among the operatives, every salaried man has been receiving more than 200 per cent bonus during the past few years. It is well known that there is absolutely no "squeezing" around this mill, which is one of the strongest factors that has contributed to its prosperity.

The question of supply and demand of cotton for local consumption in the North is interesting as well as important. Taken as a whole, China has, up to the end of 1920, about 2,000,000 spindles, more than 1,500,000 are located in Shanghai or its neighborhood. In the northern provinces there are about 300,000 spindles including those under construction and proposed, or, in other words, there are about 15 per cent of the total spindles located in the North. Yet the Northern provinces produced about 50 per cent of the cotton in China last year and it is expected a greater percentage will be produced in consecutive years. One great and distinct advantage that the northern mills have over those in Shanghai and elsewhere is the abundant and ample supply of local cotton. At the present time the larger part of the cotton grown in the North is being exported to Shanghai or to Japan. Taking the basis, on the average, each spindle consumes about two and a half piculs per annum, then 300,000 spindles would consume at the most 750,000 piculs per annum. It is clearly seen that the question of a shortage of supply of cotton for the mills in the North does not enter into serious consideration.

The high price of cotton yarn and raw cotton during 1920, which materially aided in the rapid development of the cotton mill industry in China as well as in the North, should also be considered. The price of these two reached the highest point in the early part of 1920 and has fallen down gradually. In spite of the present low price of yarn any mill would make enormous profit if it were under honest and efficient management. The following figures show the price of yarn and raw cotton showing the lowest and highest points reached by each in each of the first nine months of 1920. The Tungchow cotton and 16s yarn from a Chinese mill are taken as standard, and the following table gives the high and low figures by months:

Month	Yarn Taels per bale of 400 lbs.		Raw Cotton Taels per picul	
	Highest	Lowest	Highest	Lowest
January	195	190	33.25	32.50
February	208	198	33.50	33.25
March	209	202	34.25	32.75
April	201	188	33.95	33.00
May	188	168	33.50	32.25
June	192	172	32.00	31.00
July	178.5	165	34.00	33.00
August	173.5	162.2	32.00	28.50
September	164.5	150	30.00	28.50

Since September the price of yarn remained about the same and the price of Tungchow cotton dropped down as low as 24 taels per picul. The causes of the price decline are many and the chief ones are, first, the industrial depression in Japan which caused a dull yarn market in that country and in turn affected the Chinese yarn market; second, the decline in the price of American cotton; and, lastly, the increase in the number of spindles in China during the last year.

Besides spinning mills, there are numerous knitting factories equipped with hand power machines, scattered over various places. In Tientsin, or rather in the North, there are only two modern knitting factories equipped with Brinton machines. In spite of the lack of experience, these factories have been making fair profit. The hand weaving industry is very prosperous in this section. A certain kind of cloth, called "patriot cloth," is being produced in Tientsin, which is sold extensively all over China.

Foreign textile manufacturers, as well as those others who are interested in the textile industry, should pay strict attention to the rapid development of the cotton industry in this new field, as the demand for manufactured goods and machinery will be enormous as time goes on.

Steel Heddle Manufacturing Company, 21st St. and Allegheny Ave., Philadelphia, is sending out a useful wall calendar for 1921. Hampton Smith, 111 Washington St., Greenville, S. C., is southern manager of this concern.

Lowering Speeds to Increase Production

BY JAMES ROBERTSON.

Statements have been made that cotton manufacturing is many years behind the scientific research of other industries such as in the manufacture of steel products, oils, paints and chemicals. We should consider, however, the primary difference between the two industries, steel and textiles—one based on inorganic raw material that may be changed to any degree of characteristics desired and the other based on a raw material produced by nature, the fundamental characteristics of which are fixed in its evolution from the seed and stated in terms of grade and staple.

It is a well known fact that scrap iron may be refined by certain processes into the finest steels. By the addition of silicon, sulphur, manganese and other minerals a raw material for any desired purpose may be obtained. But when have we heard of making strict good middling 1 1/16 inch staple cotton out of waste of ¾ inch or less staple. It isn't done and can't be done unless it is changed by the farmer in its culture. So the cotton manufacturer must make use of his knowledge of the peculiarities of the cotton which he has to work with and these peculiarities vary so much that no real sound basis for comparison has been devised as yet for individual fibers.

In the study of the "Strength of Materials" in the scientific manufacture of steel a term known as the "Modulus of Elasticity" is used; this meaning that a given substance can be placed under a maximum strain to a degree where when this load is removed it will return to its original length and state of being. Expressed as a formula it is the maximum load that this material can stand per unit area of cross section and still return to its original length and characteristics.

Now, why could not this term be applied in some form to cotton? We often hear of cotton having the life taken out of it due to the severe treatment it has been subjected to and what is done is just what has been done in the case of the manufacture of steel—"the modulus of elasticity" of the cotton has been exceeded and the cotton will not return to its original length and characteristics. In short—it has been weakened.

In testing steels a tensile strength is placed on the material being examined, at both ends, and just this same principle is applied when the cotton is going through the various processes of drawing and drafting. The manner of applying the load and the *rapidity* at which the load is applied determines the maximum amount of strain a material can stand without being injured.

We know that the drawing and drafting is done by the bite of the front roll and the friction of the fiber with other fibers in the same strand of roving; also that the bite of the roll is positive and cannot be changed except by changing the weighting but the friction of the individual fibers in the roving being drafted can be lowered by lowering the twist used and thus preventing excessive stress being put on the fibers and the modulus of elasticity of the cotton being exceeded, which would result in permanently injuring the staple.

Right now comes the question of putting too little twist in the roving and the result of it breaking back in the creel or stretching, thus causing unevenness.

Here is the solution. The thing that governs the production of a mill is the front roll speed of the spinning frames; let the spindle speed, flyer speeds and the doffer speeds be what they may, the net result is what you get from the front roll of this frame that makes yarn and cloth—and nothing different.

The problem resolves itself down to the preservation of the natural strength of the fiber in the processes preceding the spinning by *lowering* the *spindle speed* of all *fly frames* together with *drawing frames* and at the same time lowering the twist on the *roving*. It will be found that with a lower flyer speed a much less amount of twist can be inserted with sometimes quite a corresponding increase in the front roll speed.

Naturally if the strength of the fiber has been preserved up to the spinning frame then we can greatly increase the production of the spinning frame because much less twist can be inserted in the yarn with the same results of breaking strength, than if the fibers had been injured in the preceding processes. Also if less twist is in the roving, then the drafting is much evener and smoother and can be done at a faster rate than if a tight twisted roving is used, for with a slack twisted roving there is less friction between the individual fibers of the cotton.

Several very important points are to be considered in the use of a small amount of twist in roving. First, there is the gauging of the bobbins used on all fly frames. If a bobbin is as much as 1/32-inch or 1/16-inch too large or too small the consequence is that the cone and builder motion is set for a certain diameter and we are trying to force a certain amount of roving on that bobbin whose diameter is 1/32-inch or 1/16-inch too large or too small and whose circumference is 3.1416 × 1/32-inch or 3.1416 times 1/16-inch too large or too small, which makes the roving stretch or pile up 3/32-inch or 3/16-inch on *each* revolution of wind.

Is it any wonder that high twists in roving are inserted in so many of our mills? But a large part of the error can be traced directly to varying sizes of bobbins used and numbers of other small points that tend in some process or other to add a strain to the cotton from which it never fully recovers, and this is passed on to the next process where something must be done to counteract the damage done in the preceding process. The result is usually more twist which means more hard drawing, less production, etc. The yarn shows up weak at the end, and the production is down below the standards set.

Another thing relative to this same point is the lay of the roving and the yarn on the bobbin, which tends, when a poor uneven bobbin is made, to act as an eccentric which puts an additional strain on the strand at one point where it is building up high and taking the strain off where it is building up low. So a very uneven strand is made which has been strained additionally at the already thin portions.

In passing, it might be well to give two tables showing just what the variation was in weight per yard in the picker laps in two mills, one using two processes of pick-

ing and the other three. Both mills were making approximately 21s warp yarn. The tests included taking 144 separate yards from each of the two mills (twelve yards separately from each of twelve laps for each mill). The methods shown in Tables I and II are self explanatory.

TABLE I.

Showing variation in individual yards in a mill using two processes of pickers.

FINISHER LAPS.

Standard Weight Net 50½ Pounds.

Weight of Lap ounces per yard 17.

SIX LAPS TAKEN ABOVE STANDARD WEIGHT.

Lap No.	1	2	3	4	5	6
Wt. in Lbs.	51	51	50¾	51	50¾	51¼
Max. Variation in Twelve Test Yds. taken in oz. per yd.	.49	1.31	1.68	1.60	.68	1.67

Total maximum variation in 72 test yards, 2.15 ounces per yard.

SIX LAPS TAKEN BELOW STANDARD WEIGHT.

Lap No.	1	2	3	4	5	6
Wt. in Lbs.	50¼	50½	50¼	49½	50¼	49½
Max. Variation in Twelve Test Yds. taken in oz. per yd.	.62	.92	1.89	1.70	2.09	1.17

Total maximum variation in 72 test yards, 2.32 ounces per yard.

Total maximum variation in the 144 test yards, 2.52 ounces per yard.

TABLE II.

Showing variation in individual yards of laps in a mill using three processes of pickers.

FINISHER LAPS.

Standard Weight 40½ Pounds.

Weight of Lap Ounces per Yard 12.3.

SIX LAPS TAKEN ABOVE STANDARD WEIGHT.

Lap No.	1	2	3	4	5	6
Wt. in Lbs.	40⅝	41¼	40⅝	41	40⅝	40⅝
Max. Variation in Twelve Test Yds. taken in oz. per yd.	1.62	1.55	.64	1.25	.85	1.90

Total maximum variation in 72 test yards, 2.42 ounces per yard.

SIX LAPS TAKEN BELOW STANDARD WEIGHT.

Lap No.	1	2	3	4	5	6
Wt. in Lbs.	39¾	40	40⅜	39¾	40¼	40⅜
Max. Variation in Twelve Test Yds. taken in oz. per yr.	.93	2.43	1.19	.47	1.30	1.65

Total maximum variation in the 72 test yards, 2.55 ounces per yard.

Total maximum variation in 144 test yards, 2.64 ounces per yard.

Two processes gives a maximum variation between the lightest yard weighed and the heaviest yard found of 2.52 ounces variation in a yard and in the mill using three processes of pickers the maximum variation in one yard samples was found to be 2.64 ounces per yard.

Since we know that picking is one of the severest processes in the mill and one which tends to treat the fiber in such a manner that it will not retain its natural strength, the mill superintendent might try the experiment outlined in the tables on his intermediate and finisher pickers and note the variations in the weight of yard samples between the two, provided that both are equipped with evener motions, or simply by running laps from the breaker directly to the finisher pickers. After all it is the variation in the individual yard of the lap that makes the variation in sliver later on and not the total weight of the lap, which may contain thick and thin places.

To get down to the real basis of the article the writer can best illustrate it by giving some actual results obtained in a mill making 30s warp and 42s filling by the use of the comparative Table III showing the changes made in speeds, twists, etc., and the results obtained. The warp spinning is not shown but the results obtained were just the same as in the filling with the additional note that the breaking strength was increased something like 4 to 6 pounds, bringing the breaking strength from below standard to above standard. The results obtained were largely due to the initiative and interest of the superintendent and overseer in charge.

The table shows that the speeds used were cut to something like those recommended by the manufacturer with a net increase of 15 per cent added production.

TABLE III.

Showing increase in production due to decrease in twist and also decrease in spindle and flyer speeds together with other necessary data.

SLUBBER FLY FRAMES.

Before or After the Change.	No. of Frames Tested.	Make	Hank Fel.	Hank Del.	Average RPM Flyer	Average RPM Front Roll.	Draft.	Twist Constant or Mult.	Production—Increase or Decrease Percent.
Before	2	Whitin	.160	.68	821	166.5	4.25	1.56	
After	2	Whitin	.165	.74	723.5	172.0	4.47	1.23	Increase 3.3
Before	2	Woonskt.	.160	.64	772	166.5	4.00	1.48	
After	2	Woonskt.	.165	.70	703	171.0	4.24	1.23	Increase 2.72

INTERMEDIATE FLY FRAMES.

Before or After the Change.	No. of Frames Tested.	Make	Hank Fel.	Hank Del.	Average RPM Flyer	Average RPM Front Roll.	Draft.	Twist Constant or Mult.	Production—Increase or Decrease Percent.
Before	2	Whitin	.68	1.72	1080	140	5.04	1.48	
After	2	Whitin	.74	2.00	887	123.5	5.42	1.39	Decrease 11.8
Before	2	Woonskt.	.64	1.60	975	130.0	5.02	1.46	
After	2	Woonskt.	.70	1.70	883	134.5	4.86	1.29	Increase 3.46

FINE FLY FRAMES.

Before or After the Change.	No. of Frames Tested.	Make	Hank Fel.	Hank Del.	Average RPM Flyer	Average RPM Front Roll.	Draft.	Twist Constant or Mult.	Production—Increase or Decrease Percent.
Before	2	Whitin	1.72	6.00	1420	96.3	6.96	1.65	
A fter	2	Whitin	2.00	6.50	1217	95.6	6.50	1.40	Decrease 0.7
Before	2	Woonskt.	1.60	5.40	1393	95.0	6.76	1.70	
After	2	Woonskt.	1.70	5.30	1265	108.0	6.24	1.41	Increase 13.7

SPINNING FRAMES.

Before or After the Change.	Make	Hank Fel.	Average RPM Hank Del.	Average RPM Spindle	Front Roll. Average RPM	Draft.	Twist Consta or Mult.	Production—Increase or Decrease Percent.
Before	Whitin	2.00	42's	8400	90	14.0	4.65	
After	Whitni	3.25	42's	9695	104	12.9	3.74	Increase 15.5

In closing let it be repeated that in using less twist in any process let the speeds of the flyers or spindles be reduced and an increase in front roll speed is usually obtained as a result of a change of both. Many times a decrease in the amount of twist can only be effected by this decrease in spindle or flyer speed, but of course, a better breaking strength, better running work, and better satisfied help is thus obtained, which is desired by all mills.

Also to be reckoned, the matter of lower speeds means the consumption of less horsepower for operation and a corresponding decrease in the amount of depreciation, which is an important factor in present high priced cotton mill machinery.

The Practical Technic of Mule Spinning

BY ARTHUR L. BURTON.

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Copping Troubles.

Before disturbing the copping mechanism of any mule not giving satisfaction, the practical man in charge will have ascertained at just what part of the cop the trouble lies. It may be the case that the bottoms only give trouble, or it may be that the whole cop is unsatisfactory. As stated before, nearly all the troubles with weaving or winding cops come after the bottom shoulder is reached. The drag of unwinding in the shuttle when the cop is getting towards the bottom is greater than when the cop is nearly full, and this happens also in the winding room, as anyone going through a winding room can see for himself. The most breakage is near the bottom of the cop.

The shape of a cop is a fairly good guide as to what is the matter, although sometimes mules make cops of a peculiar shape which are really excellent.

For instance, examine exhibit 3, Figure 5. The chase on this cop shows a very tight winding and a low counter faller, nevertheless, the nose is good and hugs the spindle. The writer has had mules making these peculiar chases which have given perfect satisfaction, and yet it will be seen by examining exhibit 4, Figure 5, that identically the same chase is shown as in exhibit 3, but notice the nose.

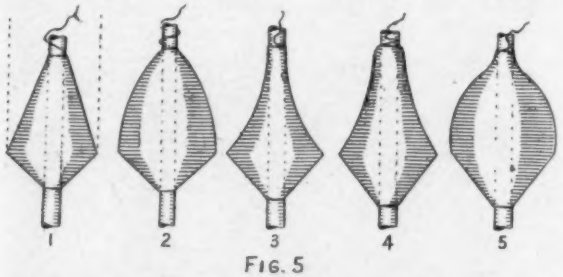


FIG. 5

This chase shows a low counter faller until the mule nears the beam, when it will be seen that the counter faller makes a sudden rise, showing slack yarn and a soft nose. It will be seen that this mule-spinner will be handicapped with such a wind, and will have to be putting on his nose peg while the cops are still in the bottom, a rather unpleasant necessity sometimes.

This illustration is given so as to demonstrate the fact that the shape of a cop is not always the correct thing to go by in looking for cop troubles, although it must be said that it is really the best guide to start with in looking for cop building troubles.

We will assume, as previously stated, that the readers of these articles are practical men, and from now on, for imagination's sake, as well as for illustrative purposes, we will suppose them to be in charge of mule spinning departments, and that they have considerable trouble with their cops, one way or another,—poor winding, weaving poorly, too much waste, etc. We will assume that these men have tried all they know to improve the cops by the usual methods and have failed to make much impression or to show better quality. They are determined to overhaul their copping apparatus. Very well, we'll take the first mule. What's the matter with it? Slattered bottoms? Yarn keeps breaking in the bottoms when unwinding? Too much waste at the loom or winder? What's that you say, it doesn't slatter any more after the bottom is quarter finished? All right.

We may find the faller weight levers touching the floor during winding when the faller is high after doffing. Or we may find the belting finger, connected with the counter faller by chain, binding against the spindle frame when the faller is high. Or we may find the winding chain slipping a tooth now and again during winding, especially after doffing when the spindles revolve rapidly. The shark's jaw, or click spring on the winding click wheel, may be striking something slightly during the moment when the faller is highest during winding; or the chase may be so short as to cause the faller to ride not only too high, but very uncertainly; or the taking in friction may be in bad shape. As a mule is hardest to wind in when it has just been doffed, the friction slips here, if anywhere. An uncertain wind of friction, slipping, etc., will cause a faller to jump unevenly and will cause slattering. Or the quadrant bands may need tightening, or the quadrant re-setting.

Run the mule in slowly until the counter faller has reached its highest point, then stop. Examine all the remedies mentioned, and it is a foregone conclusion that we will find just what is slattering the yarn underneath the chase. Do not have the unlocking bracket set so abnormally late after doffing that the spinner is forced to run his counter faller as near to the ceiling as he can get it to avoid cutting his threads down during unlocking.

The overseer fixes this mule, and is pleased to see that it has stopped slattering. He thinks of another mule slattering under, in the same room, and he says to himself that he might as well straighten that out too. But he finds that he has exhausted all the usual methods, and still it slatters. Very well, we find that this mule makes a very short bottom, in fact it is so short and stubby that it cannot help but slatter under very easily, even the spinner thoughtlessly laying his hand on a counter faller sickle during winding causes it to slatter.

Measure, with a steel rule, the distance from the studs supporting the copping rail at the front plate to the shoulder of the plate. Then loosen the adjustment screw a few squares. The builder can then be wound up another whole turn of the builder wheel, or less or more as desired.

Then lengthen the chase with the rising screw one round or more. This will make the bottom longer, and the lengthening of the chase will prevent the crowding of each successive layer of yarn so that slattering results. The bottom will be longer, less stubby and more firmly wound.

If we desire to lengthen the chase in the bottoms without affecting the length of the chase at the top of the set, let back the back plate a few squares of the nut on the adjustment rod. This will have a tendency to prevent slattering also, by making a slightly longer wind after doffing. Or, if the chase is very short all through the set, turn the rising screw on the front of the copping rail until the correct length is obtained, after which fasten it securely. Always make sure to run the mule in slowly on the first draw after tampering with the copping mechanism, so that the adjustment of the boot leg can be made, and the distance of yarn on the spindle or tube, etc., fixed correctly.

Slattering of yarn under cop bottoms is a common trouble and results in a lot of waste being made. It is safe to say that it can be cured by overhauling the mechanism as described, in the majority of cases it is simply a matter of lengthening the chase slightly in the cop bottoms, and the trouble is gone.

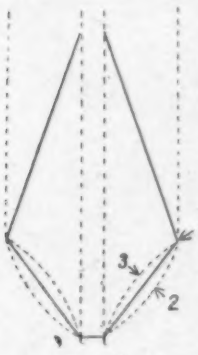


Fig. 4

We will now turn our attention to the illustration, Figure 4. The full lines, 1, denote the correct outline of the cop bottom, the dotted lines, 2 and 3, show imperfect building of the cop bottom.

There are many things that will cause these imperfect cop bottoms, and putting aside the setting of the sector finger (which will in itself constitute a whole article later) we will consider the causes of the imperfections 2 and 3.

Dotted line 2 shows a bulging bottom. When packed in boxes, or cases, cops of this build cause a large amount of waste, because the bottoms are easily spoiled. If the chase in the cop bottoms is satisfactory in length, and the bottom is still too rounded, take out the slips or slides on each side of the headstock and known as the headstock slides. Take them in the shop and set them on the planer. Test them with a straight edge. They may be worn considerably. If so, plane them straight (more will be said later about rounded sides). When replacing them (having previously jacked up the mule carriage at the headstock) be careful not to disturb the equalized weight on the carriage wheels too much. While the weight of the mule carriage at the headstock is still off the slides, level them up, seeing that the packing is very secure, and does not sink somewhat when the weight is placed on top of them. If wishing to allow any leeway at all, see that there is a very slight incline in the slides from the front slide foot to next slide foot towards the center of the slide. Do the same at the back, tapering the slide from next to last slide foot to the back slide foot. (See Fig. 6.) In this way, the headstock slide has a somewhat rounded effect as shown exaggerated by the dotted line in Fig. 6. Then let down the carriage on the slides. Adjust the weight on the wheels with the carriage half way out. It may be necessary to top the mule again with the rollers, if this is done, loosen off the back stops first.

Before starting up the mule, see that the packings under the copping rail beds are tight. After starting up the mule, follow previous instructions relative to adjusting the boot leg, etc. Also do not forget to look the quadrant over, tension of bands, etc.

The idea of having the headstock slides leveled up, or slightly rounded is to prevent the mule carriage from sinking somewhat during winding, thus throwing the yarn slacker than it should be, causing a high counter faller, sometimes slattering, and most always rounded bottoms.

Dotted line 3, Fig. 4, shows a concave bottom. It may be caused by too small a quadrant pinion abnormally pulling down the counter faller during winding, or the chase may be too long. If the chase is all right for length in the bottoms, then proceed to level up the mule head slides

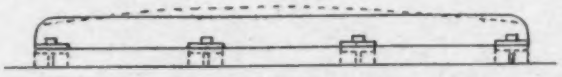


Fig. 6

similar to the last example, except that it may be well to be careful to examine them for level before loosening them. It is possible that the slides are too high in the middle, in which case the remedy is obvious.

Examine the locking of the faller at the nose of the cop. The locking plate may be too far back, causing the copping faller wire to lock too shallow. This is a very fruitful cause of cop imperfection as at 3, Fig. 4.

Examine Fig. 6 closely. Heavy full lines denote the level slide. Dotted lines show the leeway given to the track, if any is given. Proper oversight on this setting will repay itself many times over in making a good winding mule.

A thorough study of the headstock slides, and what they will do to a mule in matters of winding is well worth while as the man in charge will realize when he resets them. Always bear in mind that it is the copping rail which should impart movement to the copping faller wire, and if there is any other movement, such as the carriage rising or falling during the inward run of the mule, it shows up in no uncertain manner.

That is the reason I illustrate a very slightly rounded headstock slide, so that there shall be no sinking during winding, and if there is any movement of the carriage at all, it will be in the same direction as the shape of the rail, thus materially assisting the rail in its function of winding yarn on the chase of the cop.

The defect illustrated at Exhibit 3, Fig. 5, if it may be called a defect, is too deep a locking of the copping faller, taking the yarn too far away from the nose of the cop. It may have been caused by too small a quadrant pinion. It would be well to look the slides over at the headstock, but as very little waste is made from a chase of this kind, with such a good nose, it would be well to go easy and get this chase as straight as possible with ordinary settings at the locking plate, quadrant, etc., rather than on a too radical a scale.

At Exhibit 4, Fig. 5, however, we have the same concave chase with a soft nose. This is a very bad case. It shows that the headstock slides are very rounded, and sink decidedly at the back. This throws a lot of slack yarn on the mule when nearing the beam, and the spinner is forced to have a late unlocking bracket, early cam steeple setting, antikinking motion working, etc., to prevent kinks or snarls.

Level up the slides as before, and they will, in all prob-

ability, be found too rounded. After leveling up the slides, stop the mule at the back off, and notice the depth of the locking. It may need setting deeper, if it does, so much the better. The quadrant may need puling out a tooth nearer the beam, or the spindles may be getting too far under the rollers at the beam; 2¾ inches is a fairly good average setting out from the rollers to the spindles.

It will be found that the radical effect of resetting headstock slides, locking plate, quadrant, etc., will be effective in a cop bottom of this kind.

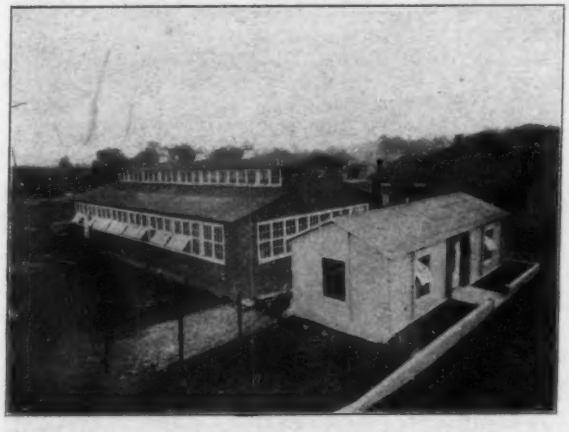
At Exhibit 5, Fig. 5, the opposite cop bottom to the one we have just treated is seen. Here we find a high winding faller with a decided ducking and consequently tightening of yarn at the beam. This shows the headstock slides up at the ends and sinking in the middle. Level them up, rounding somewhat, and see the bad winding and rounded chase disappear.

After setting the slides, always adjust the boot leg, quadrant, length of chase, depth of locking of the copping faller, and see that the unlocking bracket is properly adjusted. It is really wonderful what can be accomplished with careful settings of these parts, but the fixer must have a definite course mapped out before he tackles a mule, so that he will not be at sea and make matters worse.

[This is the second of a series of articles on "copping." Others are to follow.]

Terrell Machine Co., Inc., Builds New Plant.

The Terrell Machine Company, Inc., of Charlotte, N. C., builders of quill-cleaning machinery, has made the most progressive growth in the history of their special line of manufacture. Headed by E. A. Terrell, an efficient and successful man, this company has, in the short space of two years, shown a net increase in business of 200 per cent in volume. The company began business as a partnership



NEW PLANT OF THE TERRELL MACHINE COMPANY, INC., CHARLOTTE, N. C.

under its present name in December, 1916, and continued under that management until June, 1917, when it was incorporated with a capital of $25,000.

With a return to normal times in the new year and with conditions changing back to a peace basis officials of the company anticipate a gain of at least 25 per cent in 1921 over the record business of 1920.

On June 1 of last year the company's business had grown to such an extent that the old quarters were found to be too small. Additional floor space was necessary and the company purchased a three-quarter block of land adjoining the Southern Railroad property for its new plant.

The new building, which has a floor space of 4,000 square feet, which is just twice that of the original plant, was carefully designed from an economical manufacturing standpoint, the machinery being arranged so that material in process is constantly proceeding toward a spacious stock room, from which it is issued to the assembling room. The lighting system of the new shop is ideally arranged, there is plenty of room for each individual workman, and everything possible for the convenience and benefit of the employees and tending toward the manufacture of a perfect product has been installed.

Since occupying the new site very favorable increases in production, as well as in the quality of the work produced,

AN INTERIOR VIEW OF THE PLANT.

have been noted. The very latest labor saving machinery has been installed which has had a decided effect in increasing the output of the company.

A feature of the new plant is the attractive office building which was recently completed. This building of reinforced concrete is located directly in front of the workshop.

The production of the Terrell Company in 1920 was 100 quill-cleaning machines. It is expected that this number will be increased to 125 in 1921. At this writing there are approximately 225 Utsman quill cleaning machines in operation in the United States and Canada. The machine manufactured by the Terrell company is named for the original patentee. It was redesigned by E. A. Terrell in the fall of 1917 and was placed on the market in 1918.

The machines are spread over territory which stretches from Texas to Canada. New England mills have purchased as large a number of the machines as have those located in the southern section. Among the larger cotton mills which have already installed the Utsman are the Carolina Cotton and Woolen Mills, Fieldale, Va.; the Cannon Manufacturing Co., Kannapolis, N. C.; Chadwick-Hoskins Company, Charlotte, N. C.; Corsicana Mills, Corsicana, Texas; Eagle & Phenix Mills, and Columbus Manufacturing Co., Columbus, Ga.; Hamilton Carhartt Mills, Mobile, Ala., and Rock Hill, S. C.; Erwin Cotton Mills Company, West Durham, N. C.; Canadian Cottons, Hamilton, Ontario; Dominion Textile Co., Montreal, Quebec; Palmer Mills, Three Rivers, Mass., and the Pepperell Manufacturing Company, Biddeford, Maine.

BUSINESS PROFITS VERSUS

by Stephen R. Gordon

EXECUTIVE

FOR DETAILS REFER TO EXPENSE ANALYSIS

NO.	DEPARTMENT	PROD LABOR	LEARNER EXPENSE	MISC. NON. PROD LABOR	MACH. REPAIRS	TOTAL DEPT. EXPENSE	%EXPENSE TO LABOR			
							LAST MONTH	THIS MONTH	PERIOD TO DATE	NORML
0	TRUCK			$ 485 00		$ 212 74	52½%	44%		50%
1	GEN. OFF. & ADMIN.			1 959 35		2 506 97				
2	BOILER			466 69		1 415 25				
3	POWER & LIGHT			64 00		1 169 47				
4	MILL OFFICE			138 45		328 77				
5	GENERAL MILL			1 605 09		2 184 73				
6	WINDING	$ 1 890 06	$ 0 00	745 14		2 295 47	106%	121%	110%	100%
7	KNITTING	1 861 69	0 00	939 72	$ 31 02	3 408 95	163%	183%	157%	150%
8	BLEACH & DYE	1 030 79	0 00	126 00	42 10	2 060 48	248%	200%	209%	200%
9	DRYING	919 38	0 00	45 00	206 89	1 444 64	154%	157%	147%	145%
10	NAPPING	290 21	0 00	40 73	0 00	180 50	252%	62%	150%	150%
11	CUTTING	2 205 32	0 00	629 97	47 43	1 482 28	73%	67.3%	703%	70%
12	SEAM & FINISH	9 871 97	4 44 59	4 829 48	283 35	9 721 43	98%	98½%	88%	85%
13	PRESS. FOLD-BOX	2 787 48	58 66	953 37	92 65	2 169 57	125%	77.8%	100%	105%
14	CASE MAKE	436 07		0 00		342 77	47.3%	78½%	49½%	45%
15	PACK & SHIP	792 99		319 50		780 43	171%	99½%	123%	115%
16										
	TOTAL	$ 22 085 96	$ 503 25	13 345 49	$ 703 44	$ 31 704 45				
17	SELLING					$ 2 450 00				
	TOTAL					$ 34 154 45				

The attitude of the Federal Reserve Board in Washington and bankers in general has been very apparent during the trying times of the past six months. The propaganda for lower commodity prices originated with the banking interests and was in time taken up by the newspapers of the country. The result is reflected by the liquidation of large stocks of material, marked reduction in prices, and a general slowing up of business in every commodity. The same result might have been accomplished in a different way but we will all agree that speculation and profiteering was running wild and had to stop. If it had been allowed to run its course, a financial panic would no doubt have resulted. The banking interests realizing the condition stepped in and forced liquidation, which has been accomplished without serious consequences, as most of the business institutions have made money in the past three years and are strong enough financially to stand their present losses. Serious consequences will be avoided provided the hammering for lower prices is discontinued.

The entire propaganda may have been carried too far, but at the present time it is hard to judge. When the full readjustment is accomplished a review of the attendant disorganization of business will give us a measure of the success of the propaganda. In the meantime we know that some industries have been hard hit. However, it is gratifying to see that the Federal Reserve Board and the general banking interests realize that the propaganda has been carried far enough. In fact, the newspapers are now publishing statements by the Federal Reserve Board, calling attention to the prosperity of this country and the good business that is being done. The leading bankers do not go quite so far but publish optimistic opinions of business for the near future and predict a revival of good business on a sound financial basis.

This country and business in general is on a better basis financially than ever before but the liquidation of stocks of merchandise cannot be pushed too far—or the strain will become too great and serious consequences will result.

COMPARATIVE COST RECORDS

of Stephen Gordon and Staff

REPORT — MILL Nº2

FOR 4 WEEKS ENDING AUGUST 30TH 1920

EXPENSE GAIN	EXPENSE LOSS	PRODUCTION IN LBS. OR UNIT DOZ. NORMAL	PRODUCTION ACTUAL	LABOR COST IN LBS. UNIT DOZ. NORMAL	LABOR COST ACTUAL	LABOR GAIN	LABOR LOSS	REMARKS
								NORMAL
								NORMAL
								NORMAL
								NORMAL
								NORMAL
								NORMAL
	$ 405 41			PIECE	WORK			NOTE Nº 1
	616 51			"	"			Nº 2
# 0 00	0 00	No	163443 #	$ .01	# .0082	$ 235 09		Nº 3
	111 54	No	132997 #	# .092	# .069	304 22		Nº 4
141 57	0 00		48797 #	# .044	# .0594		$ 75 50	Nº 5
41 14			18687 DOZ.	PIECE	WORK		29 01	NORMAL
	1 045 10			"	"	335 48		NOTE Nº 6
683 19			12222 DOZ.	# .02	# .0235		70 57	Nº 7
			14001 DOZ.	# .13	# .148		260 02	Nº 8
	161 98		8963 DOZ.	# .06	# .0885		255 21	Nº 9
# 865 90	# 2 340 54					$ 874 79	# 690 31	

THE NOTE IN THE ADJOINING COLUMN REFERS TO NOTE NO. 2 IN THE EXECUTIVE REPORT AND ILLUSTRATES THE METHOD OF USING THIS CONDENSED REPORT.

Note No. 2. Knitting Department.

The increase in the percentage of expense to productive labor is due to an excess've needle charge. This should be investigated and the knitters cautioned in the use of needles.

The statements recently made by the Federal Reserve Bank are correct and a propaganda of optimism should be started to counteract the opposite propaganda of the last six or eight months and call a halt in the liquidation of merchandise. Business is bad because of lack of confidence and stability. Every one has money and would buy if they did not feel that probably the next day they could buy cheaper. Prices are certainly low enough, and a feeling of confidence must be instilled throughout the country to bring business back to normal. When this is accomplished, and it must be, through newspaper and magazine publicity, our factories will gradually get back to normal production.

Many of us thought that after election business would be better. That was not because a new administration would immediately do anything to better conditions, but because a feeling of confidence would be created and react favorably toward business in general.

To create a feeling of confidence, we must all be conservatively optimistic and work hard in an earnest endeavor to stabilize prices. Losses will have to be taken but when prices have been stabilized, manufacturers can—eventually—make up these losses through wise and constructive policies.

For the past few years increased production has been our only thought regardless of waste or cost. During the next few years we must endeavor to eliminate waste and reduce cost. The American Federation of Labor have adopted a resolution that in the future there shall be no cause for reflection upon labor for un-economical manufacture or curtailing of production. If labor is sincere in this resolution and intends to carry it through, untold savings can be accomplished in the factories of the country. There also seems to be a strong sentiment in labor circles to let the industrial engineer be the mediator between labor

and the management. This is a tremendous step forward on the part of labor and the managers of industry should meet them in the same spirit.

Without proper cost records the executive of a plant is entirely in the dark and cannot proceed in the elimination of waste and more economical manufacture. Many executives look upon a cost system as a mass of unintelligible figures that arrives at an answer through many devious paths. Since he does not understand the method of figuring he usually has little confidence in the final costs presented to him. Unfortunately in many cases the executive has reason to be dissatisfied, for there are numerous cost and industrial engineers who are thoroughly incompetent, and install systems that are in reality masses of unintelligible figures, and that give no definite result.

Such embryo experts have tended to discredit the profession, but there are many competent engineers in the profession as attested to by the many thoroughly satisfied executives. A proper cost system not only gives the final cost of the manufactured article but by comparative departmental records month by month gives a measure of the manufacturing economy of each department which very often leads to substantial savings.

The Executive Report illustrates the method of condensing the departmental figures in such form that an executive can at a glance pick out the weak spots. Investigation can then be carried to the detail records and correctional methods instituted.

Savings can be made through more efficient operation of machinery, a better handling of the article of manufacture or the cutting down of raw material waste. Several instances of such savings are as follows:

Labor Saving.

How easily are the small and seemingly trivial items of labor and expense overlooked in a large and prosperous manufacturing plant. As a business grows to large proportions, the thoughts of the worthy executive naturally turn to larger affairs, and the consideration of the more minute details must of necessity be delegated to his subordinates or lieutenants, who ofttimes have not the eagle-eye of the executive nor his capacity for analyzing the seemingly insignificant details which help to build success and which, if neglected, very often multiply to an aggregate of expense that will change profit into loss.

Every item of unnecessary waste must be duplicated if an article is to be produced therefrom, adding just that much more to the manufacturing burden. By gathering up all loose ends and analyzing the smallest items, the manufacturing cost is brought down to a minimum, the gross profits are greater and a mill is in a better position to meet close competition.

An example of saving due to better handling of the article manufactured is as follows: In the manufacture of underwear a label or hanger, as it is called, must be sewn on the neck of the garment. In some mills the hanger is sewn on in the finishing department before the garment is pressed and folded; in other mills due to different conditions the hanger is sewn on after the garment is pressed and folded.

In a particular mill the garments were delivered to the hanger sewing machines after being pressed and folded. The operators were partly unfolding the garments in order to sew on the hangers. This mussed the garments and they had to be carefully refolded by the operators before being passed on to the boxers. Photograph No. 1 illustrates the operator sewing the hanger on a garment that has been unfolded.

After some investigation we found that it was not necessary to unfold the garments to sew on the hanger. By a slight change in the machine and in the instructions to the operator in the new method of handling the garments,

THE OPERATION SHOWN IN THIS PHOTO COST $4500 A YEAR MORE THAN—

THE SAME OPERATION DONE ANOTHER WAY AS SHOWN IN THIS PHOTO.. WHAT METHOD DO YOU USE?

the sewing of the hanger was accomplished without unfolding or mussing the garment and in very much less time per dozen garments.

Photograph No. 2 illustrates the new method and shows the operator sewing the hanger on the folded garment and the pile of neatly folded garments after sewing.

This in itself seems to be a very insignificant change but let us see the saving involved.

By the old method one operator could do 50 dozen garments per day with an average pay of $18.00 per week. This would figure 6½ cents per dozen.

After the new method had been in operation for a few weeks a straight piece rate of 3½ cents per dozen was set which allowed the operators to average about $20.00 a week.

The production of the mill was about 500 dozen garments a day.

Old Method: 500 dozen per day × 6½ per doz. × 300 working days = ...	$9,750.00
New Method: 500 dozen per day × 3½ per doz. × 300 working days = ...	5,250.00
A clear labor saving per year of	$4,500.00

Saving Due to More Efficient Operation of Machinery

Under this heading I wish to call attention to a fault which invariably occurs where there are a number of machines on identical operations.

Upon examination of Table No. 1, it will be noticed that spinning frames turning out identical yarn are running at different speeds. This is due to any one of a number of reasons, such as slippage of belts, motor speed not according to specifications, wrong drive pulleys, wrong gearing, etc., any one of which may be rectified. Small variations of speed are justified but it will be noticed that in some cases the variation amounts to more than 10 r. p. m.

A machine running at too great a speed and turning off bad yarn, is more expensive than one running too slowly. Therefore, in measuring the loss due to variation in speed, we have taken an average speed and illustrate the saving as follows:

Take 11s yarn. A 276 spindle machine at 144 r. p. m., for the front roll, produces 21¾ pounds of yarn per hour.

The machines run 22 hours per day. 121 minutes between doffs. 4 minutes to the doff—allow 4 per cent as time for doff.

Total running time per day of 22 hours less 4 per cent for doff equals 21.1 hours producing time.

21.1 hours per day × 300 working days per year = 6,330 frame hours per year, which at a speed of 144 r. p. m. or 21.¾ pounds per hour × 6,330 hours = 137,677 lbs. of yarn per frame per year. At a speed of one r. p. m. the product would be 956 lbs. of yarn per frame per year.

From a table of machine speeds, all machines should run at 147 r. p. m.

On 11s yarn running on only 12 frames in the table we show a loss of 30 r. p. m. or 30 × 956 = 28,680 lbs. of yarn per year. 11s yarn at 49¼c per pound, which was the price quoted at the time would equal—

28,680 lbs, at 49¼c per lb. = ...	$14,124.90 sales price.
28,680 lbs. of cotton at 32c =	$9,177.60
Drawing slubbing, speeder and spinning labor at $2.08 per 100 lbs.	$ 596.56
Total cost	9,774.16
Representing a saving on 12 frames of	$4,350.74

Take 8½s yarn.

A 216 spindle machine produces 25 lbs. per frame hour at 163 r. p. m. 6,330 frame hours per year × 25 lbs. = 158,000 lbs. per year, or 968 lbs. per year at one r. p. m.

Again referring to the table of speeds we find the machines should run at 168 r. p. m. for the front roll speed. On seven frames this represents a loss of 19 r. p. m. or 968 lbs × 19 = 18,392 lbs. per year.

18,392 lbs. of yarn at 45c	$8,276.40
18,392 lbs of cotton at 32c	$5,885.44
Drawing, slubbing, speeder, and spinning labor at $1.54 per 100 lbs.	283.36
Total cost	6,168.80
Represents saving of	$ 2,107.60

Take the 12¼s and 16s yarn from Table 1. 12 frames on these yarns, showing loss of 28 r. p. m., would make them approximate to 11s yarn, 28,680 lbs. = $4,350.74.

Total increased production 75,000 lbs. of yarn per year.

Approximate clear saving $10,809.08.

These instances represent only two of the many opportunities for saving in manufacture. These savings would never have been made if the executives had not been able to measure the cost through comparative records. If there is no record to show when the cost is high, investigation cannot be made and the cost cannot be reduced.

The waste of materials and supplies offers a tremendous field for saving which is a subject in itself and will be taken up in a future article.

SPEEDS OF MACHINES—SPINNING DEPARTMENT

TABLE No. 1.

Mch. No.	Spindles	Yarn No.	Front Roll R. P. M.
1	276	12¼	141½
2	276	11	145½
3	276	12¼	143
4	276	11	145
5	276	12¼	142½
6	276	11	143
7	276	12¼	143½
8	276	11	145
9	276	12¼	140
10	276	11	144
11	276	12¼	140½
12	276	11	128
17	276	11	145
18	276	16	132
19	276	11	147
20	276	16	130
21	276	11	144
22	276	16	131
23	276	11	147½
24	276	16	142
25	276	11	145½
26	276	16	138
27	276	11	147½
28	276	16	137½
33	216	8½	162½
34	216	8½	182½
35	216	8½	165
36	216	8½	162½
37	216	8½	168½
38	216	8½	164½
40	216	8½	166

Du Pont Purpurine 10 B is a clear, bluish crimson, direct dyestuff of high concentration, possessing a brilliant shade and a wide range of usefulness. It has been brought out by E. I. du Pont de Nemours & Co., Inc. It is suitable for dyeing all kinds of cotton goods and other vegetable fibers and may be used on mixed fabrics. On half-wool and half-silk fabrics, all fibers are colored practically the same shade under ordinary dyeing conditions. This dyestuff is useful both as a self shade and in combinations for deep clarets, maroons and ox-blood. It yields clear whites when discharged with hydrosulphite or tin but its use in this respect is limited by its moderate fastness to washing. It possesses very good fastness to alkalis and good fastness to rubbing and ironing. It withstands light and washing fairly well, but is sensitive to acids and chlorine. The fastness should be determined with respect to the requirements of each particular case.

This product is dyed in the manner general for all direct dyestuffs. The dyebath should contain 20 pounds of common salt and after ¾-hour boiling, the material should be worked ¼-hour longer in the cooling bath. A thorough rinsing is advisable to remove any traces of salt or loose color that might cause streaks on the dyed goods after drying.

SPINNERS MEET

The first meeting of the Spinners' Section of the Southern Textile Association was held in Spartanburg, S. C., on January 21, with an attendance of approximately 200 superintendents, overseers of spinning and textile experts. This meeting was held on the plan of the meeting of carders in Charlotte on December 10, and further demonstrated the value of such sectional gatherings. There was a morning session and an afternoon session, with a luncheon at 1:15 o'clock at the Cleveland Hotel.

The Morning Session

was called to order about 10:30 o'clock in the assembly hall of the Chamber of Commerce Building, and the assemblage crowded the room. Carl R. Harris, chairman of the Sectional Committee on Spinning of the Southern Textile Association, and night superintendent at Lancaster Cotton Mill No. 3, Lancaster, S. C., presided at the meeting. Marshall Dilling, treasurer of the Association and chairman of its Carding Committee, and Harry H. Boyd, president of the Association, were at the speaker's table to assist in the conduct of the meeting.

The first speaker of the occasion was E. B. Walen, manager of the research department of Lockwood, Greene & Co., of Boston, who made a brief and interesting talk on the work which his organization is carrying out along research lines at the Cotton Research Company for the benefit of the mills allied with the Lockwood, Greene & Company organization. He stated that this work was conducted to achieve results similar to those sought in the sectional committee meetings of the Southern Textile Association. He stated that the machinery of this organization had been in operation only six months and that as the work progressed its importance becomes more evident to those in charge. He said that this research work is conducted in a central location so that it could render the best service possible.

When requests come in to the company, the speaker said, they are referred to a planning board which decides the details of the tests to be made. The work is then run through regular manufacturing machinery, as the board has one machine of each kind used in cotton manufacturing. "Before it goes into the machines," he said, "the cotton is measured for strength, length, etc.; afterward the waste is analyzed. In that way we can tell what has happened to the cotton during the different processes. The yarn is then taken to the laboratory and tested. We find that it is very essential to consider each factor carefully."

The speaker declared that his board had not considered the picking and carding processes as closely as might be, but that he hoped later to be able to do so.

Taking up the matter of yarn strength, Mr. Walen said that they find that the strength of the cotton fiber should increase by attenuation and that some might think it practically impossible to do this without the use of chemicals, but he said that if it would be thought of as the "survival of the fittest" it would be evident that the weaker fibers are broken out during carding and the strength thereby increased. "We try to set a standard of strength for the yarn being spun in accordance with the standard of the strength of the stock going into the yarn," he stated, "and it may be difficult to do this, but at least we have something definite to work upon."

The speaker then presented a list of questions which were compiled some eight months ago. "The great number of these," he said, "relate to the variation of the cotton from the various districts, and in such cases we run from three to five mixings at a time. We make tests on the relative merits of the Kirschner beater and the two-blade beater, and the advantages of relative humidity, also the best roll speeds of the machines." They also consider the right temperature of size, and the ways to stop selvages pulling in.

Mr. Walen then explained a new Italian spinning frame which created considerable interest among the mill men. The middle roll of this, he stated, is very small and self-weighted, yet it can be set very close without breaking the fiber.

At this juncture, the chairman invited questions from the audience on anything relating to Mr. Walen's talk, and J. R. Wikle, Consolidated Textile Corporation, asked if the tests which Mr. Walen had made had been on either North Alabama or North Georgia cotton. Mr. Walen replied that they had used only Alabama and Arkansas stock.

Mr. Dilling asked, in reference to the Italian spinning frame, "What is the highest draft they use?" Mr. Walen replied that they had experimented with drafts from 15 to 45, on 28s yarn, filling wind, using double roving. In reply to another query he said that the break draft was 1.07, and that the breaking strength was a little lower than on the regular frame. They use three processes

of picking, he stated, one of carding and two of drawing. Asked about the variation, he said the yarn ran between 27 and 30. "Pretty close," said Mr. Boyd. Mr. Walen further stated that this research department was capitalized at $125,000 and has installed $110,000 worth of equipment, has an annual expenditure of approximately $110,000 and employs 36 people.

The Practical Discussion.

At the conclusion of Mr. Walen's final remarks, Chairman Harris announced that the meeting would now enter into discussion of spinning problems. He stated that his first idea in bringing out the discussion on spinning was to start with the roving and take up each piece of machinery of the process of spinning and the relation each bears to the finished product. However, he said, he had since decided to take up speeds first.

He then said that he wanted all the men present to take part in the discussion that was to follow. "If there were no variances," he stated, "there would be little object in having meetings of this kind. Speeds are something that are governed by local conditions, the grade of cotton and the condition of the machinery. A meeting of this kind is the only means of getting at comparisons of the different methods. We must have these comparisons. This is your meeting, take part in it."

As the result of a question propounded in an endeavor to ascertain the various numbers of yarn that were represented at the meeting, 15 indicated that they were running around 20s; 15 were on 30s and four stated they were running as high as 40s or over. A number were running on lower than 20s.

The first question was, "How many are running as low as 7,000 r. p. m. on the spindles?" There were no answers. "How many run 8,000 r. p. m.?" Four responded to this question; five indicated that they were running 9,000, and two were running 10,000 r. p. m. Six in the audience indicated that they had tried different speeds before deciding upon their present speed.

In response to a question for results of some of this work, T. W. Harvey, L. H. Gilmer Co., Millen, Ga., said: "I was once at a mill where they were running two-ply warp yarn. We used a 6½ inch traverse, had 5,000 spindles and a spindle speed of 9,600; when I went there I brought up the speed to what I thought it would run, and we turned out 14,000 pounds of yarn a week running night and day." The grade of cotton was changed to 1 inch staple. After he changed, said Mr. Harvey, he got less waste in the spinning room, and the spinners were able to run more sides.

Mr. Boyd then asked whether or not it increases the breaking strength of yarn to change the amount of twist. He asked what the very best strength was for the sort of work in question. Mr. Harvey said: "I once made a test for ply yarns. There had been some complaint about the ply yarns not coming up to standard, and I went to the spinning room and reduced the stretch from 4.75 to 4.25 and the cotton came up to strength. A high twist destroys the elasticity of the yarn whereas with yarn made a little softer the elasticity is retained and the yarn breaks better."

In this connection B. R. Burnham, superintendent, Whitney (S. C.) Mills, said, "We were twisting 30s about standard and got our twist down to about 25 points above standard and gained three pounds in the breaking strength. If I remember correctly, we twisted about 5.25 to 5.30."

Mr. Wikle said, "I recently made some tests on 21½s yarn. This mill had been using a standard of 5.40 to 5.50 and the yarn was breaking around 68 pounds. After we took out some twist we brought the multiple to 4.90. In going around among our mills I find that the roving has a lot to do with the trouble. The more twist you have in the roving, the more twist you have to put in the yarn. The reason is that it seems to draw better."

Mr. Burnham asked what front roll speed was maintained in the case mentioned by Mr. Wikle and the latter stated that this was around 128 to 130 r. p. m. on new Saco-Lowell machinery. He stated that in the same mill, however, on older machinery they did not get as good results as those mentioned. The cotton used was 1 1/16 inch staple, middling to good middling, he stated. On the finisher picker a 12-ounce lap was made, he continued, with a six grain card sliver, 43 hank on the slubbers, 94 on the intermediates and 3.56 roving. Single roving was used, and the actual breaking strength was around 80 to 84. The multiple on the roving was about 1.30.

What was the breaking strength, asked Mr. Harris, after the improvement? Mr. Wikle said it was 84 pounds. He then gave an explanation of testing machinery and methods for ascertaining its accuracy.

Mr. Burnham then asked if there was not a standard speed in inches per minute for a yarn breaking machine. Mr. Walen said that the Bureau of Standards advocates 12 inches to the minute, while the tire and rubber companies require 20 inches per minute. In reply to a question from Mr. Dilling, Mr. Walen stated that the yarn put through the machine at 20 inches per minute broke higher than the other.

E. C. Gwaltney, manager, Riverdale Mills, Greenville, S. C., said, "Several years ago I made some tests on 30s yarns, with the spindle speed about 12,000 r. p. m. I find that if a man wants a test to show a certain thing, it will generally show it. We tried to entirely eliminate the human element. On our testing machines we used 50 pounds, we used 25, 100 and 75 pounds. We tried all multiples from 4 to 5½ and found that the strongest breaking strength was between 4.50 and 4.75, and then it would drop off materially. We immediately put the machines on what we thought was the best twist, but soon put the weave room out of business. Then we changed the twist back. A great many spindle bands were slipping and we found that we got the best results by putting in about two tests over the Draper standard.

"Speeds vary with the location of the mill, the grade of cotton, atmospheric conditions, amount of static electricity in the air, etc. I have run mills in the North and in the South and find that you cannot lay down any hard and fast rules for the best results in twist and speeds."

The question of drives was the next to be discussed and Chairman Harris asked, "How many are running tape drives on 30s yarn?" Five indicated that they were doing this.

A request was made for some detailed information on this and Mr. Whitener, of Gastonia, said, "I am running 50s to 60s combed yarns and have never had a great deal of experience with band drive. Most of my experience has been with tape drives."

A. W. Young, overseer spinning, Mayo Mills, Inc., Cramerton, N. C., said in this connection, "We have 25,000 spindles operated by band drive and 29,000 with tape drive. We get more even yarn with the tape drive and the spinners on these frames are able to take more sides, therefore I consider the tape drive far superior to the band drive." Mr. Young then asked the question, "What is the correct amount of yarn to use in testing to get the breaking strength of the yarn?"

Mr. Boyd then stated, "What we would like to bring out now is what is the best twist. If we have the tape drive will it improve and allow us to take out more twist?"

I. B. Covington, superintendent, Florence Mills, Forest City, N. C., said, "At the present time I have both tape drive and band drive. I use the band drive on 26½s, and the tape drive on 13½s. I find there is a considerable difference in the breaking strength of the yarn on the tape drive and the yarn on the band drive. A few years ago I constructed a winding machine from the slashers and tested the breaking strength and I find that it depends upon the way we work the yarn. In two-ply yarns we do not work the yarn very much, and in single yarns you must have all the strength you can get. If you put in less than standard twist you must add a little more twist."

Mr. Dilling asked the question, "Is there anyone who has made a test on the spinning speed with the band drive?," and Mr. Wikle mentioned using four bobbins at a time to make these tests.

Mr. Gwaltney said, in reference to this question, "Herbert Beede, of Pawtucket, made some very elaborate tests along this line. He built a machine with one side operated by tape and the other side by band drives. The variation in speed on the side driven by bands was between 25 and 30 per cent, while the tape-driven side showed a variation of only 5 to 7 per cent. The tape-driven side required 33⅓% less power than the other side of the machine.

"I once threw out 10,000 spindles that were driven by bands and replaced them with 7,000 spindles that were tape driven. We got the same, or better, strength with the tape-driven machines with no separators than with the band drive with separators."

"In the band drive method, you have got to put in more twist," said Mr. Dilling. "I would like to say that I have used both band drive and tape drive and I think the tape drive is far superior to the band drive. If necessary, I would pay twice as much for a tape drive as for a band drive. I don't suppose we find one bobbin a week that we have to throw out for slack twist. I am sure it would be impossible to do this with band drives."

Mr. Boyd asked Mr. Covington if he had made any comparison in the breaking strength of his yarn with the tape drive. The answer from Mr. Covington was that he did before he changed to tape drive. The breaking strength, he said, was about 18 pounds. It is now breaking around 24, and that the yarn is much more uniform. He said, in reply to another question from Mr. Boyd, that he used the same twist on the tape drive as on the band drive.

Referring to the difficulty related earlier in the meeting by Mr. Gwaltney, Mr. Harvey said that he thought this gentleman would not have had trouble if he had changed from band to tape-drive spindles.

The Clutch Spindle.

Chairman Harris then asked how many were using clutch spindles and asked for the experiences of some who had installed these spindles.

"My experience," said W. M. Langley, superintendent, Abbeville (S. C.) Cotton Mills, "has been that with the clutch spindles we cut the waste from the spindles more than half. We now have one-half our filling on clutch spindles and are going to put the other half on this type of spindle because of this saving in waste."

W. H. Gibson, Jr., superintendent, Union-Buffalo Mills Co., Union, S. C., said that he would highly recommend the Draper No. 2 Thompson clutch spindle. He said his waste was made less on the spoolers by the use of this type. P. A. Smith, Olympia Mills, Columbia, S. C., asked Mr. Gibson if he had any more trouble keeping the clutch spindle clean, and Mr. Gibson said he had less trouble keeping the yarn off the clutch spindle, using the same method of doffing. Mr. Culberson asked him if there was any difference in the soft yarn, and the reply was that it depends on the kind of clutch. The kind he uses, he said, never gives trouble.

L. B. Gibson, superintendent, Fairmont (S. C.) Manufacturing Co., said that with the clutch spindle he doesn't have more than a small percentage of soft yarn a week.

Mr. Dilling asked if Mr. Gibson, of Union, had made any tests for twist with the clutch spindle. Mr. Gibson said that he had not, but that he ran around standard twist and got around 112 r. p. m. on the front roll.

M. G. Stone, general superintendent, Pacolet Manufacturing Company, said, "We have one mill with clutch spindles on filling and one mill with plain spindles. I would like to have Mr. Lancaster, who is superintendent, to tell us why he prefers the clutch spindle. He frequently asks me why we don't put clutch spindles in the other mill."

Mr. Lancaster arose and said, "About the best thing I can say for the clutch spindle is that you can't get a much more uniform filling, with less tangled yarn. There is also less waste in the weave room."

Mr. Burnham, of Whitney, said, "We have tried to compare the amount of filling waste made from the old style common type spindle and from the clutch spindle and found that the amount from the old type was about 100 per cent more than with the clutch spindle."

P. T. Quinn, Draper Corporation, said, "The clutch spindle being made today will not give any trouble. You can run less twist with the clutch type because the bobbin will not slip."

A superintendent from Abbeville, S. C., stated that the clutch spindle on warp was also satisfactory, that it was not necessary to clean as much.

Mr. Harris asked if Mr. Lancaster was compelled to put in more twist. The answer was in the negative.

P. A. Smith asked Mr. Quinn if his company had made any tests with the different bobbins on the clutch spindle, one being made with a wooden base and other with a brass bushing. He stated that he had 100,000 spindles of the clutch type and a similar number of the old style. Which is the best to use, he asked, the wooden or the brass?

Mr. Quinn said that the brass was better, but that it cost more. The reason that the brass bushing cuts the bobbin, he said, is that it is sharp on the head, but it does not cut the yarn. The brass bushing bobbin is cheaper in the long run, he added, cheaper because it is not necessary to ream it out.

Discussion on Doffing.

Taking up the subject of doffing, Chairman Harris asked the question, "How many are using four doffers with a head doffers to the set?" Six indicated that they were. "How many use three doffers?" Four responded. There were twelve who indicated that they were using two doffers to the frame and eight of those present had only one doffer to the frame. One man indicated that he was using more than five doffers.

"I use two doffers to a group of twelve frames," said T. W. Harvey, Millen, Ga., "on 8s, 10s and 12s yarn. My reason for doing this is that it will keep the doffers occupied, and I find I get better production. I think a head doffer is merely a figure head and of no use."

Mr. Harris said that he knew of one instance where a mill is using one doffer to the frame. This mill is running by the hank, and the spinners run enough extra at noon so that the mill is getting more than 100 per cent production. The doffer helps the spinners who also help him in his work.

A. W. Young, Cramerton, N. C., said, "I use three doffers to the side with a head doffer. I think the head doffer is very important. If necessary, I would rather dispense with my section man than to lose the head doffer. I got 100 per cent production, last year, too. I contend that I can get more production by using more boys. I hold the head doffer responsible for the doffing."

Mr. Burnham of Whitney referred to Mr. Harris' statement in reference to getting "more than 100 per cent production" and asked for more information concerning the number of yarn, speeds, etc.

Mr. Harris said that the mill to which he referred really hasn't a doffer. They put so many spinners on so many frames, with the one doffer. This operative doffs the frames with the aid of the spinners and never leaves the mill. This is done in a room of 125,000 spindles, he added, making 30s warp, with around 113 r. p. m. on the front roll.

In connection with the stating of percentages of production, Mr. Gwaltney remarked that he thought the men should give these percentages, also stating the machine builder's standard production to which it relates. For instance, he pointed out, Draper has higher standards than other builders and production that would be 90 or 100 per cent of this standard would not have a similar relation to another standard.

Mr. Boyd added that it might also be well for the speakers to give the time of operation when stating percentages of production.

The next question to be brought before the meeting was that of oiling, and the chairman asked for experiences along this line.

One overseer stated that he uses red oil on the back saddles and semi-fluid lubricant on the front saddles. He puts lubricant on the saddles once a week and oils the spindles every day. The back rolls do not need as much oil as the front rolls, he explained, inasmuch as they do not run as fast. He expressed it as his opinion that red oil is more penetrating than other makes.

A superintendent from Abbeville, S. C., recommended a semi-fluid lubricant. He says that he uses this on the front and back rolls. He begins with the front rolls and then goes to the saddles and then the back rolls. "We are getting good results and lubricate about half as often on the back as we did with red oil. We lubricate the back rolls once a week and the front rolls every other day."

Mr. Gammon said that he oils once a week.

Mr. Burnham said they use a semi-fluid lubricant at Whitney and lubricate the back rolls once a week and the front rolls every other day.

Mr. Whitener said that he has shell rolls and uses a semi-fluid lubricant once every two weeks, front and back.

P. A. Smith said, "My experience has been that we had to oil with loom oil and red engine oil twice a week to keep enough under the saddle to keep it from running dry. This was on 30s. When we changed to a semi-fluid lubricant we lubricated the back rolls twice a month and the front rolls once a week. We got good results and reduced the amount of lubricant about one-half, and also eliminated oil spots on the yarn. It depends much on the width of the saddle."

In reply to a question from the chair as to whether he used less rolls after he had changed over to the semi-fluid lubricant Mr. Smith said, "I have no exact data, but with the present system we use about 300 rolls to 48 frames a week, but ordinarily rolls do not have to be changed because of lack of oiling."

Mr. Harris asked, "How many rolls should a spindle run a week?" Mr. Burnham said, "As well as I can remember it is about one and one-half to the side a week, with an average of 200 spindles to the side, and the yarn averaging about 17½s."

The next question was, "Has anyone a system of oiling

whereby they can tell when each part of the machine has been oiled?"

W. M. Langley, Abbeville, S. C., said in reply to this question, "We have a system of oiling with which we know we are getting our oiling done on everything, and obtain very good results from this system. We save a lot of bearings and gears and re-necking of rolls and also wearing on the top rolls. In order to accomplish this, however, it is necessary to get the labor systematized.

"We have a certain day for certain things to be oiled and have the machines inspected to see that oiling is done. Upon examination, if we find that the parts are well lubricated, we assume that the oiling has been done, though we have no way of ascertaining whether or not the work was done at exactly the specified time."

None of those present indicated that he was having the oiling done by a section man, following a question from the chair.

W. H. Gibson, Jr., Union, S. C., said that he didn't see why there was not some kind of a chart gotten up on oiling, similar to those prepared by automobile manufacturers. "I would suggest," he said, "that the secretary of the association take this matter up with the different lubricant people."

Mr. Burnham suggested further that it would probably be best for the mill men themselves to get up such a chart.

This induced a question from the chair inviting any machinery men in the room to give any recommendations as to oiling.

Mr. Quinn, Draper Corporation, recommended oiling spindles with wick every two weeks, those with solid bolster every week.

Mr. Harris pointed out, in connection with the discussion on oiling, that in most instances it is customary to have the same man as oiler and bander. Inasmuch as banding bears such an important relation to production, he declared, would it not be plausible to cut the number of frames to the section man down and let him do the oiling.

A superintendent stated in this connection that he has a section man running 16 frames who also does the oiling.

O. W. Smith, overseer, The Trion (Ga.) Company, said, "We have about 61,000 spindles and have a man who does nothing but the oiling. However, the oil that we use causes sores to appear on the arms and legs of the oiler. If this had occurred with only one man, I would have attributed it to blood trouble, but we have had this trouble with three men in succession." It was suggested that Mr. Smith take the matter up with his State Chemist for an analysis of the oil.

The Luncheon.

The convention luncheon was held in the dining room of the Cleveland Hotel at 1:15 o'clock, when an appetizing meal was served to more than 150 of those in attendance at the meeting. After the lunch, a solo was rendered by Johnny Walker, and a duet by A. B. Carter and Johnny Walker came along with the deserts. J. Flournoy Crook, president of the Spartanburg Kiwanis Club, made a short address welcoming the visiting mill men to Spartanburg.

The second speaker was E. G. Wilson, secretary, Y .M. C. A., Spartanburg, who made an interesting talk on the importance of the human factor in industry, and on what the "Y" is doing to aid the mills in increasing morale among operatives. C. F. McCall, overseer of spinning, Union-Buffalo Mills, Union, S. C., who was one of the first members of the Southern Textile Association, was the next speaker and recounted the history of the Association. M. G. Stone, dean of the Association, then gave a few welcome words, and the speaking was brought to a close by a short talk by Harry H. Boyd, the incumbent president.

The Afternoon Session

was called to order shortly after 3 o'clock by the chairman, who announced that he would like for those present to enter into a discussion of the question, "What is the best thing you ever did in a spinning room?"

J. V. McCombs, superintendent, Buffalo (S. C.) Mill, said he thought the best thing he ever did was to lubricate his lifting rods with pure lard. He used to have trouble, he said, with the lifting rods on the spinning frames. He found that by lubricating the rods with pure lard—two drops per rod per week—the trouble was eliminated. Formerly, the spindles which had been reamed out stuck and the friction stuck the rods, but that now he doesn't average cleaning out a stuck rod once a month.

Mr. McCall, Union, S. C., said, "I have been a strong advocate of oiling lifting rods with lard oil.

"One other thing I have found beneficial is to keep a good corps of overhaulers. We have our spindles gone over and the frames leveled and lined once a year.

"It is hard to keep up with every detail, but it is a matter for the overseer and one which he should try to instill in the men under him. We are trying to teach our men to anticipate, to look forward to the things that might happen tomorrow, to watch details. I have conferences with my second hands and section men once a week. I have a private room where I take these men and talk with them one day a week. I give them my views and allow them to criticize me, and I find it very helpful. I think our good organization is due to the fact that we are trying to cooperate with the men under us and teach them the value of cooperation. To teach them that they are not mere machines, but that they should be examples and teachers. As a result we notice a very material gain in production and an improvement in the appearance of the room. The boys take pride in having a place for everything. We believ that it is very essential that we keep everything as clean as possible. Quality first, then quantity.

"I would like to ask a question in reference to balance twist as applied to ply yarns. Will someone explain just what 'balance twist' is?"

The chairman stated that the question would be taken up later in the meeting, and asked, "How many are using a wide enough gauge so that they do not have to use separators?" Three indicated they were.

E. C. Gwaltney, Greenville, S. C., said in this connection, "We once threw out 10,000 narrow gauge spindles with separators and replaced them with 7,000 wide gauge without separators, and could increase the speed. We produced more pounds on the wide gauge. In breaking strength we increased 30 per cent on H. & B. We attained a twist that very few mills can equal. The yarns were very even, very level, there was no variation in twist, and we could run the lowest twist per inch ever. We reduced the cost of manufacture by the elimination of the separators. This reduction was fully one-half. I have never seen such running. If necessary to choose between the two, I would take the wide gauge in preference to tape drive."

George M. Dean, Saluda Mfg. Co., Greenville, S. C.,

said that in his opinion the wide gauge is much better than the narrow gauge and that tape drive is far superior to band drive. The spinners can run more sides with the wide gauge, he said, with less tangled work. He is running a 3¾ inch gauge on 4s to 12s warp yarns.

Mr. McCall, Union, S. C., said, " I have had some experience on hosiery yarns on a 3¼ inch gauge, on Whitin frames, and they turned out very satisfactorily. The superintendent told me that he wanted 2.75 twist. I put this in and started off. The spinners were running from twelve to sixteen sides on that twist. The superintendent said the yarn was too soft and we had to put in 3.25 twist. This was on hosiery yarn filling wind."

Carl P. Thompson, superintendent, The Trion (Ga.) Company, said, "We have some wide gauge, 4 inch, Whitin, on 22½s warp, also some 2¾ gauge. There is no comparison in the two frames. The spinners are able to tend to more sides, and we get a greater roll speed by 10 per cent. The doffers get along better, and the breaking strength is 20 per cent better. However, we run single on the narrow gauge and had double on the wide gauge."

"I recently criticized a friend of mine for not doing just what Mr. Gwaltney did," said Mr. Dilling. "He was changing his spinning and had put in 2¾ inch gauge.

"It is so much better to run, you can use lighter traverse, and I agree with the gentleman who says that the wide gauge is worth more than it costs."

Mr. McCombs, Union, S. C., said that he had run 8½s with a spindle speed of 7,500 r. p. m. He had 20 frames with a 2¾ inch gauge and said he had never been able to get more than 6½ pounds a spindle daily production. On the 4 inch gauge, however, the production was from 7 to 7½ pounds per spindle.

"In one mill," he continued, "we found that putting in a 2¼ inch ring was too large, so we changed to 1⅞. I ran from 10s to 20s and on the small ring I got standard H. & B. production, raising it from 64,000 on the large ring, to 72,000 on the small ring."

Mr. Young, Cramerton, N. C., said that he had his entire room equipped with 3¼ inch frames, and would feel like he was being put into a dungeon if put back on narrow gauge, though he was raised on narrow gauges up to five years ago.

Chairman Harris then asked the next question, "Has anyone made any tests on increasing the break draft?" "What were the results of such tests?"

He then said further that "some tests were made in this connection from a 30 days' run, with a test every day, on 30s yarn. On the regular work we got 5½ pounds under breaking strength. We increased the break draft between the back rolls to 1.33 and made one test without the weight on the middle roll. In that test we got around 51 pounds breaking strength. Using the same frame with the weight on the middle roll we got 53.2 breaking strength. We got 2 pounds more breaking strength using a 1.33 break draft." He was asked if he used standard roving in these tests and replied that roving around standard was used, but that the same roving was used on all three tests.

J. V. McCombs said, "In regard to break draft, I know of a certain mill that was started up in 1901 on 30s warp and 40s filling. They used one Saco-Lowell frame and this frame got out with a 1.07 draft. This mill was having trouble with the roving running out the sides and when they went up three teeth the yarn broke at 55 and the roving quit running out the side and there was no more trouble."

"Has anyone made tests on 30s warp, single roving?" asked the chairman. Mr. Harvey said that he had worn out his patience trying to make 30s on single roving and then gave it up. Mr. Harris said that he knew of one instance where they are trying to do it, but that they cannot "get breaking strength."

David Clark, Charlotte, N. C., said he was talking to a man who had spent more than 20 years running spinning in England and that this man had told him that in England they never ran double roving under 65s. "Can someone explain why the English can do it, but we don't in this country,?" he asked.

E. C. Gwaltney, Greenville, S. C., replied, "'I know a chap who worked in England about three years and we were once talking about this very thing. He claimed that the Englishman does not grab a bale of cotton and shoot it into the opening room, or let some negro do it. The Englishman blends his cotton. We do not card in this country, we make sliver; the Englishman cards. Further, his roving frames are kept up better and he gets away with the single roving by a careful selection of his cotton. If we buy a set of clothing, it runs till it wears out and then we throw it away. The Englishman runs it in a fine mill and then sells it to a coarser mill, who in turn disposes of it to a waste mill. I don't know what they do with it then. But the Englishman cards slowly, picks carefully, and selects his cotton carefully."

Mr. Harris then asked, "What has been the experience of those here in taking the weight off the middle roll, and what were the results?"

J. V. McCombs said, "I have made 23s yarn and ran it with Hinds metallic rolls with no weight. I closed the rolls up tight and got an unusual breaking strength. The break draft was 1.07. In preparing this cotton on the drawing frames we used metallic rolls and got 5 to 8 pounds better than with the plain leather rolls."

The chairman then asked for a discussion of the relative merits of the No. 1 flange and the No. 2 flange on rings. Mr. Harvey said he was running a No.1 flange on 8s.

Mr. Burnham, of Whitney, said that they are using both the No. 1 and the No. 2, but that they have not gone far enough into it to form any definite conclusions.

Mr. McCombs advised that he had run a No. 1 flange ring on 1¾ inch cotton with a 1¾ inch ring, on 23s yarn. The front roll speed was 140 r. p. m., with a twist on 3.30. Every noon and night, he said, he found anywhere from 1,000 to 3,000 spindles where the yarn had wrapped around the traverse. He would use nothing but a No. 1 flange on American cotton, he said, but would not recommend it for cotton 1½ inch staple or longer.

W. P. Loftis, spinner, Woodruff (S. C.) Cotton Mills, stated, "Most of my experience has been on filling. We had a No. 2 flange ring and a No. 1 flange ring. I like the No. 1 flange ring. I got more front roll speed with the No. 1 than with the No. 2. I could not get enough of the No. 1, however, and had to change to No. 2. I find that with anything from 30s up, the No. 1 flange will do better, with 1¾ inch ring and 7 inch traverse."

Mr. Harvey asserted that he had No. 1 flange on 8s, 10s and 12s, and the advantage is that he can get a heavier

traverse with less friction than with the No. 2 and is therefore, a little partial to the No. 1.

Chairman Harris then advised that several men who were evidently interested in the subject had questioned him regarding the best draft to use on 30s warp, and asked the men who were running on that work to call out their drafts. At the suggestion of a man in the audience, these men also gave their hank roving. Following were the drafts and hank rovings given: 10.60 draft, 6 h.r.; 10.80 draft, 5.88 h.r.; 11.25 draft, 5.45 h.r.; 10.90 draft, 5.80 h.r.; 10.97 draft, 5.75 h.r.; 11.94 draft, 5.30 h.r.; 10.30 draft, 6.25 h.r.; 10.91 draft, 5.30 h.r.

The chairman then made a request for similar information from those men present who were running on 42s filling, and this time the front roll speeds were added to the data given. The answers were: 12.80 draft, 6.75 h.r., 105 front roll speed; 12.81 draft, 7 h.r., 90 r. p. m. front roll speed; 11.75 draft, 7.85 h.r., 95 r. p. m. front roll speed

More information was asked from the man who said he was getting a front roll speed of 105 r. p. m. and in replying, E. P. Knowles, overseer spinning, Ella Division, Consolidated Textile Corporation, Shelby, N. C., stated, "We are getting along very well with a front roll speed of 105 r.p. m. The spinners are running from 8 to 10 sides. The spindle speed is 7,993 r.p. m. on about 1-inch Upland cotton. The traverse varies from 1½ to 1¾ inch, with 6-inch bobbin, and a 1⅜ inch ring. We card about 100 pounds a day. We have a 3.84 twist per inch. We have Whitin frames and spindles, on band drive, too. We have the bands looked over every two weeks and keep the slack bands broken off."

Mr. Harris next asked for spindle speeds on 30s warp on spoolers and 750 r. p. m. and 700 r. p. m. were recommended.

A man stated that he knew of one mill where they changed from filling to warp and changed the spindle speed from 750 r. p. m. to 920 r. p .m. Mr. Quinn, Draper Corporation, pointed out that with filling wind, a faster speed is needed while on warp the slower the speed the better.

Mr. Dilling said, "I am running filling wind on 60s with a spooler spindle speed of 1200 to 1500, but of course this does not apply to 30s warp."

The chairman then asked if anyone had made a radical reduction on the speed of their warpers.

Mr. Wofford replied he cut from 55 yards per minute to 49 yards per minute on his warpers.

A man stated that cone drives on warpers will get more yarn, in reply to a question from the chair regarding the use of cone drives on warpers.

P. A. Smith, Columbia, S. C., asked the question, "How many use ball bearings on the measuring roll on the warper?" Seven indicated that they were. These men were asked whether they got evener running on the slasher sets. Mr. Burnham said, "We find that we average not over 1½ pounds of waste to the set." Mr. Cothran, Spartan Mills, Spartanburg, S. C., said they were getting not over 1½ pounds of waste with the ball bearings, whereas they formerly had three pounds.

Mr. Smith said, "I have 29 warpers. I would get from 6 to 12 pounds of soft waste on a set of 7 beams. We started a test, taking beams from the same warper, and the waste reduced to 3½ and 5 pounds. Then we changed to ball bearings and that got about the same results when taking two beams a set from one warper; it reduced the waste 40 per cent after getting on ball bearings."

The chairman then asked if anyone who has the group drive has made experiments with the counter shaft to determine the variation of speed on these counters?

J. V. McCombs advised that he had 20,000 spindles on four frame drive and 10,000 spindles on 20 frames driven in one group, by a squirrel cage motor. The four frame drive showed up 3 to 5 per cent better, he said, than the other.

W. H. Gibson, Jr., Union, S. C., said that he had found that in running two frames from one belt, one of the frames would run faster than the other. Mr. Stone, of Spartanburg, said, "Mr. Gibson, do you want to know a remedy for that?" Mr. Gibson replied in the affirmative, and Mr. Stone replied, "Use individual motor drive."

T. W. Harvey, L. H. Gilmer Co., Millen, Ga., seemed of the opinion that Mr. Gibson's difficulty would be eliminated if he used fabric belts rather than leather belts. "It has been a known fact for 100 years," he said, "that leather and iron won't mix. The further you get away from the main drive, your multiple percentage increase will be that much more. We have changed our mill from leather belting to fabric belting and have eliminated leather belting entirely. We have 12 frames on each side of the shaft. We find that we have considerable less slippage and a reduction in waste through the use of the fabric belt. Our cylinder speed would formerly vary from 10 to 40 turns a minute with the leather belting. We have now eliminated the leather belting and for the past 18 months have been running all our machinery with fabric belting with very excellent results."

Discussing further the individual motor drive, J. A. Chapman, Jr., Supt., Inman (S. C.) Mill, said, "We changed from double drive to individual drive and got two to five turns difference on the front roll. I have 170 frames on individual drive and 26 frames on 4-frame drive. The motor drive is the only thing for a spinning frame."

Mr. Wikle read the results of some tests he had made showing the variation that took place in some motors, causing a natural variation in the speed of the machine being driven.

A superintendent stated he had 50,000 spindles on direct drive and was not having any trouble at all.

Mr. Hawkins asked, "What is the best cloth to cover solid rolls and how often should traverses be changed, on 30s warp yarn?"

Mr. Britton, Spartan Mills, replied that a 24-ounce cloth was good for warps, and a 28-ounce for shell rolls on filling.

Several of those present took up the discussion of "balance twist," brought up earlier in the meeting by Mr. McCall, and various opinions were given. Among the men speaking on this subject were Messrs. McCombs, Harvey, Wikle and Boyd.

The conclusion of this discussion brought the meeting to an end and adjournment was declared, after admonitions on the part of Messrs. Harris, Boyd and Dilling to the men asking them to give their cooperation in the preparation of the questionnaires to be rendered at the Atlanta meeting.

An attractive calendar is being sent out by the Southern Distributing Co., Charleston, S. C., importers and distributors of starches, softeners and weighting compounds and soluble oils for all warp sizing and finishing purposes.

Income Tax Laws and Regulations

Recent Treasury decisions affect materially returns of income taxes which will be made by business men for the year 1920. Among the more important is the decision in relation to valuations of inventories, in accordance with which a taxpayer may, regardless of his past practice, adopt the basis of "cost or market whichever is lower," for his 1920 inventory. In his return the taxpayer must state that it represents a change from this former basis. Thereafter, changes can be made only after permission is obtained from the Commissioner of Internal Revenue.

In the case of a merchant "cost" means the invoice price less trade or other discounts excepting strictly cash discounts approximating a fair rate of interest, which may be deducted or not at the option of the taxpayer, providing a consistent course is followed. To the net invoice price should be added the cost of transportation and other necessary charges incurred in acquiring possession of the goods.

In the case of a manufacturer "cost' means the cost of raw materials, and supplies, expenditures for labor and indirect costs incident to production, including a reasonable proportion of management expenses, but not including any cost of selling or securing return on capital.

"Market" means the current bid price prevailing at the date of the inventory for the particular merchandise. The burden of proof as to the corrections of the price rests upon the taxpayer in each case. Where no open market quotations are available, the taxpayer must use such evidence of a fair market price at the dates nearest the inventory as may be available, such as specific transactions, or compensation paid for cancellation of contracts or purchase commitments. Where, because of abnormal conditions the taxpayer has regularly sold such merchandise at prices lower than the market bid price, the inventory may be valued at such prices. The correctness of the prices will be determined by reference to the actual sales of the taxpayer for a reasonable period before and after the date of inventory. Prices which vary materially from the actual prices so ascertained will not be accepted as reflecting the market. In such instances, the penalties prescribed for filing false and fraudulent returns—a fine of not more than $10,000 or one year's imprisonment or both, together with the cost of prosecution and an added assessment of 50 per cent of the tax—may be asserted.

The value of each item in the inventory may be measured by cost or market, whichever is lower. An entire stock may not be inventoried at cost and also at market price, and the lower of the two inventories used. Inventories on whatever basis taken will be subject to investigation by the Commissioner of Internal Revenue, and the taxpayer must satisfy the Commissioner of the correctness of the prices adopted. He must be prepared to show both the cost and the market price of each article included in the inventory.

Business enterprises, for the purposes of the income tax, may be divided into three classes: those engaged in making, those engaged in producing, and those engaged in trading. To these may be added another class which neither produce, make nor trade, but render what may be designated as business services, such as transportation, storage, livery and garage service, in which case the gross income would be the total amount received or earned.

In mercantile accounting the gross profit for a given period is obtained from a group of accounts known as trading accounts, consisting of inventory, purchases, sales, freight, returns, and allowances, and in certain cases discount and freight charges outward. Discount should be charged or credited to the distribution accounts of the business. Freight outward should be considered a selling expense.

There are three elements which enter into the cost of a manufactured product, cost of material, cost of labor, and manufacturing expense, sometimes called overhead. The first and second elements go to make up the prime cost of manufacturing. Gross income in such business means total sales less the prime cost of goods sold. Treasury regulations provide that in determining gross income subtractions should not be made for depreciation, depletion, selling expenses, or losses, or for items not ordinarily used in computing the cost of goods sold.

The Revenue Act provides for the deduction of business expenses. Among the items to be treated as business expenses are material, labor, supplies and repairs in the case of a manufacturer, while a merchant would include his purchase of goods bought for resale. In either case the amount to be taken as a deduction for the year 1920 should be determined by taking into consideration the inventory at the beginning and end of the year. Other items that may be included as business expenses are reasonable compensation for the services of officials and employees, advertising, and other selling expenses, together with insurance premiums against fire, storm, theft, accident or other similar losses, and rental for the use of business property.

A taxpayer may deduct the necessary expenses paid in carrying on his business from his gross income from whatever source. In computing net income upon which the tax is assessed, a deduction for business expense or a disbursement or charge must have certain qualities in order to be allowed. It must relate to a trade, business, profession, or vocation, "carried on" by the taxpayer in which he has invested time and money for the purpose of a livelihood or profit. A business is being carried on by its owner, even though all its activities may be conducted by employees.

The deduction must be a "business expense" and not an "investment of capital." Amounts expended for the erection of new buildings, installation of machinery and the purchase of tools or implements of permanent value do not constitute business expenses, being merely a change in the form of capital and not a reduction of wealth. Expenditure for property which is used up in the course of the year may be deducted as a business expense.

Many representatives of business houses will be benefited by a recent Treasury decision relative to traveling expenses. Reasonable and necessary traveling expenses include railroad fares, and meals and lodging. A traveling man, working on a salary without reimbursement for traveling expenses, or employed on a commission basis with no expense allowance may deduct his expenses for railroad fare, and also his expenses for meals and lodging in an amount in excess of the ordinary cost for such living expense when at home.

If he receives a salary and is repaid his actual travel-

ing expenses, he must include as gross income an amount equal to the ordinary expense for meals and lodging when at home, as such amount is held to be additional compensation to the taxpayer.

Numerous errors relative to claims for deductions for losses have been discovered in returns of prior years. To be allowed, deductions for losses must be confined to the following classes: Losses sustained in trade or business; losses sustained in transactions entered into for profit though not connected with a trade or business; losses sustained of property not connected with trade or business if arising from fires, shipwrecks, storms, or other casualty, or from theft. To the extent any of the above losses are compensated for by insurance or otherwise, they are not deductible.

A common loss of a person engaged in business is the destruction or theft of merchandise. A merchant who uses inventories to ascertain his profit should not make on his books entries for any of his stock in trade that is destroyed or stolen, for the reason that such loss will be reflected in his closing inventory. If his books are kept on a cash basis which properly shows his correct profits, he may deduct specifically the amount of his loss. In either event, if the merchant receives insurance for such losses he must include in his gross income the amount of such insurance.

Loss of cash by burglary or embezzlement may be deducted by an entry debiting profit and loss and crediting cash. The amount of such loss should be reduced by the amount of insurance covering it and by the reasonable value of any claim against the embezzler or his sureties which have an ascertainable value such as a claim against the surety company. A loss incurred through embezzlement is an allowable deduction from gross income only for the year in which the embezzlement occurred.

Bad debts form an important item in the returns of many business men. Claims for such deductions must have certain qualities. The debt must have been charged off within the year in which its worthlessness was discovered; the return must show evidence of the manner in which discovery was made; a statement should be made that the debtor has been discharged in bankruptcy or has disappeared leaving no trace, or that the ordinary means of collection have been exhausted.

Where the creditor continues to extend credit a debt may not be claimed as worthless. A debt may not be charged off or deducted in part, but must be wholly worthless before any part can be deducted, though it may be clearly worth less than the face amount. If a debt is forgiven, it cannot be deducted because it is then regarded as a gift.

The Revenue Act provides in relation to deductions that a reasonable allowance may be made for the exhaustion, wear and tear of business property. This applies to buildings and equipment, such as motor trucks, horses, delivery wagons, or machinery.

Return of individual income if the net income was $5,000 or less must be made on Form 1040-A. If the individual net income exceeded $5,000 the return must be made on Form 1040. If the business is operated by a partnership a return must be made on Form 1065, even though the firm had no net income for the year.

Partnerships as such are not subject to the income tax, but individual members are taxed on the distributive shares of net income from the business, whether distributed or not, and are required to include such shares in their individual return, even though they may have been actually received. Similarly, if a business is incorporated a return must be made on Form 1120, regardless of its net income.

Forms for making corporation, partnership, and individual tax returns are now available at offices of collectors of internal revenue. Copies will be mailed by collectors to persons who filed these returns last year. Failure to receive a copy however, does not relieve a taxpayer of his obligation to file a return on time. The period for filing is from January 1 to March 15, 1921. This year as last the tax may be paid in full at the time of filing the return or in four equal installments due on or before March 15, June 15, September 15, and December 15. The return must be filed with the collector of internal revenue for the district in which the taxpayer resides, or has his principal place of business. Heavy penalties are provided by the revenue act for failure or willful refusal to file a return and pay the tax on time.

"The way to a man's heart is through his stomach." This old adage, used as a domestic means to an end, might seem to have no relation to the more practical task of increasing the production of a cotton mill with a reduction in the unit cost. To get a dyspeptic husband to early dinner is one thing, but to raise the health standard and productive capacity of an employee—through betterment work—is another thing, and is particularly trying because of the fact that any evidence of charity or paternalism is resented by the employee—a perfectly natural, human feeling—and unless such elements as these are eliminated from the betterment work the proposition will inevitably make for detriment in the ultimate result.

This is where the industrial restaurant may be brought in to function successfully where, possibly, a more idealistic plan has failed in its purpose. When you supply a man with wholesome, nutritious food, for which he pays, so that he doesn't have to do his work on "something cold he brought from home in a newspaper," it is but natural that he is better, physically, to turn out more and better work. That rings up one score toward the desired end. Add to this the fact that in an industrial restaurant the employee eats in comfort—to himself and to his pocketbook—but still hasn't "gotten something for nothing," and the success of the proposition is but logical. It isn't philanthrophy; it's hard business sense.

An interesting and thorough exposition of the industrial restaurant as a means to improving employer-employee relations is contained in "The Employee Betterment Book" recently issued by Albert Pick & Co., Chicago, Ill., which also gives descriptions of the equipments manufactured by this company.

At a meeting of the Board of Directors of the Textile Banking Company, Inc., held December 21, a quarterly dividend of 2 per cent was declared, payable January 15, 1921, to stockholders of record as of December 31, 1920. The following were elected officers of the company: M. C. Rheinboldt and C. S. Hasbrouck, assistant treasurers, and W. A. Cunningham, assistant secretary.

Soap

BY WILLIAM B. NANSON.

Vegetable and animal oils and fats consist for the most part of the glycerides of the higher fatty acids. There are, however, some few exceptions to this, such as sperm oil and a few other similar oils which contain, in place of the radical of glycerin, solid monatomic alcohols, which are also combined with fatty acids.

Glycerides, when treated under suitable conditions with strong bases, are decomposed, glycerin is liberated, and salts of the fatty acids are formed. All such salts, taken in the widest sense, are soaps. In the ordinary sense, however, soap is understood to refer only to the compounds formed by the action of fatty acids or their glycerides upon the bases "potash" and "soda" alone. These are soluble in water, all others (excepting ammonia soaps, which are not of much practical importance) are insoluble.

Previous to 1823 it was believed that soap consisted simply of a binary compound of fat and alkali. Geoffroy in 1741 and Scheele, in 1783, discovered that fat or oil recovered from a soap solution by neutralization with a mineral acid differed from the original fatty substance by dissolving in alcohol which is not the case with ordinary fats and oils and that a sweet substance now called glycerin was obtained as part of the operation.

These discoveries of Geoffroy and Scheele formed the basis of Chevreul's researches by which he established the constitution of oils and the true nature of soap.

All fatty oils and fats are mixtures of glycerides, that is of bodies related to the alcohol glycerin $C_3H_5(OH)_3$ and some fatty acid such as palmitic acid $(C_{16}H_{31}O_2)H$. Under suitable conditions:

$$C_3H_5(OH)_3 + 3(C_{16}H_{32}O_2)H = C_3H_5(C_{16}H_{31}O_2)_3 + 3H_2O$$

Glycerin — Palmitic Acid — Palmitin — Water

The corresponding decomposition of a glyceride into an acid and glycerin takes place when the glyceride is distilled in superheated steam, or by boiling in water mixed with a suitable proportion of caustic potash or soda. But in this case the fatty acid unites with the alkali into its potash or soda salt, forming a soap:

$$C_3H_5(C_{16}H_{31}O_2)_3 + 3NaOH = 3NaC_{16}H_{31}O_2 + C_3H_5(OH)_3$$

Palmitin — Caustic Soda — Soap — Glycerin

The fatty acids most commonly found in soaps are those obtained by the saponification of lard and tallow, that is to say, the stearic, palmitic, and oleic acids. In addition to these, soaps frequently contain the following fatty acids: lauric acid from cocoanut oil; brassic acid from rape oil; linoleic acid from linseed oil; and occasionally recinoleic acid from castor oil. The fatty acids are monobasic acids, where glycerin, the radicle of which is combined with the fatty acids in neutral oils and fats, plays the part of a tri-acid base; it is a trihydric alcohol. When oils or fats are boiled with potash or soda, saponification takes place, three molecules of the alkali being required to displace one of glycerin. For example, stearin, which is glycyl tristearate (the chief constituent of mutton fat) undergoes the following change when boiled with caustic potash:

$$C_3H_5(C_{18}H_{35}O_2)_3 + 3KHO = C_3H_5(HO)_3 + 3KC_{18}H_{35}O_2$$

Stearin — Potash — Glycerin — Soap

890 + 168 = 92 + 966

In which, as the equation shows, 890 parts of stearin are decomposed by 168 parts of caustic potash to make 966 parts of anhydrous soap or "potassium stearate," and 92 parts of glycerin. If palmitin or glycyl tri-palmitate (the chief constituent of palm oil) were used in place of stearin a similar reaction takes place; but on account of the difference in their molecular weights the quantities are different, as shown by the following equation:

$$C_3H_5(C_{16}H_{31}O_2)_3 + 3KHO = C_3H_5(HO)_3 + 3KC_{16}H_{31}O_2$$

Palmitin — Potash — Glycerin — Soap

806 + 168 = 92 + 882

In this case 806 parts of palmitin are decomposed by 168 parts of potash to make 882 parts of anhydrous soap or "potassium palminate" and 92 parts of glycerin.

Thus, when a triglyceride is saponified, we obtain a soap and glycerol. The sodium soaps are the common or hard soaps and the corresponding potassium compounds are termed soft soaps. The sodium soaps are generally separated from the glycerin by taking advantage of the fact that they are insoluble in strong salt solution. If the mixture be saturated with salt, the soap becomes insoluble and rises to the surface, it is then skimmed off and washed and dried, the brine is evaporated and the glycerin removed by distillation, the salt being simultaneously recovered. If salt be added to a solution of potassium soap, the latter is decomposed, potassium chloride and sodium soap being formed thus: $C_{17}H_{35}COOK + NaCl = C_{17}H_{35}COONa + KCl$, therefore it will be seen that it is not possible to salt out a potassium soap by means of salt. Generally the mixture of potash soap and glycerin is sold as such, being termed soft soap. Many potash soaps, however, made from fatty acids, do not contain glycerin. It is possible to obtain a hard potash soap if a hard fat such as tallow or its fatty acids is used; but the soap is always softer than the corresponding sodium compound.

Both potassium and sodium soaps are slowly soluble in cold and readily soluble in hot water. When a hot solution of soap is cooled it does not crystallize like an inorganic salt, but forms a jelly which melts again on warming. This property increases with the molecular weight of the fatty acids of the soap. Soap being a colloid the same as starch and glue its jellying power is also similar to these substances. Soap dissolves in alcohol, but is only slightly soluble in other organic solvents, such as ether or petroleum ether. Benzine, however, has the power of dissolving certain soaps, particularly those of the heavy metals. Thus oleates may be dissolved in this solvent for the preparation of a detergent soap.

Soaps are precipitated unchanged from their aqueos solutions by soluble sodium compounds such as salt. Different soaps require different amounts of salt to cause the precipitation. Thus cocoanut and palm oil soaps require much more than other soaps, and are, on this account, used in the manufacture of marine soaps, since they are capable of forming a lather with sea water. Soap is immediately decomposed by acids, with the liberation of the original fatty acid.

If a solution of soap be treated with a metallic salt whose soap is soluble in water, the soap is immediately thrown down, hence the production of insoluble lime and

magnesium soaps is the source of much trouble in bleaching, but the zinc soaps are sometimes intentionally produced for the purpose of giving to the fabric waterproof properties.

Lime, magnesia and zinc soaps are fairly soluble in benzine and these solutions have a certain value in finishing cotton goods. We have seen that palmitin, stearin and olein are the principle fatty bodies used in soap making. Palmitic acid $C_{16}H_{32}O_2$ occurs in most vegetable and animal oils; and notably in palm oil, in Chinese vegetable tallow, Japan wax, and myrtle wax. It occurs also in spermaceti and in opium wax as caryl palmitate and in beeswax as myricyl palmitate. The metallic salts (soaps) of palmitic acid resemble very closely those of stearic acid but they possess a somewhat greater solubility. Stearic acid $C_{18}H_{36}O_2$ occurs very abundantly in many vegetable and animal fats, especially in the hard ones, such as cacao butter, shea butter, and tallow. The higher the melting point of a fat, the higher is, as a rule, the proportion of stearic acid it contains. Stearic acid can be obtained synthetically by the reduction of less saturated acids containing an open chain of 18 carbon atoms (oleic, linolic, clupanodonic) by means of hydrogen in the presence of a suitable catalyst such as nickel or palladium. Like palmitic acid it possesses neither smell nor taste. Oleic acid is found in most vegetable and animal fats especially in the liquid ones, in combination with glycerol and is best prepared from tallow.

Many chemical compounds, when treated with acids or water, are decomposed into the hydrates of their constituents. Such decompositions are termed hydrolysis. Soap possesses in a marked degree this property of being hydrolized by water. When an alcoholic solution of a neutral soap is treated with phenolphtalein, no color reaction will take place. If the alcoholic solution be now diluted with water, a pink color will now appear showing the presence of free alkali. Thus sodium stearate, when treated with water, gives caustic soda and acid sodium stearate. Different soaps have different hydrolizing powers, depending upon the nature of the fatty acids which they contain. As a general rule it may be stated that the higher the molecular weight of the fatty acids the more readily do their soaps hydrolyze. The amount of hydrolysis depends upon the dilution, increasing with it until a point is reached, after which further addition of water liberates no more alkali.

The amount of hydrolysis also increases, as a rule, with the temperature of the water.

The hydrolyzing power of a soap is retarded by the presence of free alkali, glycerin and soluble neutral salts, such as sodium chloride and sulphate. If two equal weights of dry soap be placed in two beakers and one dissolved in distilled water and the other in the same volume of a dilute solution of sodium sulphate or chloride, it will be found on the addition of phenolphthelein that much less acid is required to discharge the pink color in the presence of the neutral salt. When a certain proportion of the salt is present, hydrolysis is completely prevented and no pink color is produced. This seems to throw some light on the use of salt in soaping colored goods, since it prevents the liberation of free alkali by hydrolysis (which attacks the color) but does not interfere with the detergent power of the soap.

The reaction which takes place when soap becomes hydrolized is a complicated one. Chevreul found that a neutral soap hydrolyzed to an acid salt, free alkali, and a small amount of fatty acids and Chevreul's views have been fully confirmed. The extent to which a soap is hydrolyzed depends upon the acid and upon the concentration of the solution; it is also affected by the presence of metallic salts such as lime and magnesium.

Soaps differ considerably in solubility in water and the lathering power generally follows the solubility. The lathering power of two soaps can easily be compared by measuring the volume of a one per cent solution required to give a permanent lather with a given volume of distilled water. As a rule soaps that hydrolyze most readily have the greatest lathering power. I might say at this point that hydrolysis and saponification are synonyms where soap is concerned.

Hard water by retarding hydrolysis causes great waste of soap. When a solution of soap is added to pure water, the solution remains quite clear, and only a little is required to produce a lather on shaking. If, however, the same soap solution be added to a hard water a turbidity is immediately apparent, owing to the decomposition of the soap by the lime and magnesia, and the production of the corresponding calcium and magnesium soaps, which are insoluble in water and therefore incapable of producing a lather. Upon continuing the addition of the soap solution, the turbidity increases until sufficient has been added to decompose all the calcium and magnesium compounds in the water. When this point has been reached, and not before, a few more drops will cause a lather to appear on shaking. Taking sodium oleate as a typical soap, these reactions are shown by the following equation:

$$CaH_2(CO_3)_2 + 2NaC_{18}H_{33}O_2 = Ca(C_{18}H_{33}O_2)_2 + 2NaHCO_3$$
$$CaSO_4 + 2NaC_{18}H_{33}O_2 = Ca(C_{18}H_{33}O_2)_2 + Na_2SO_4$$

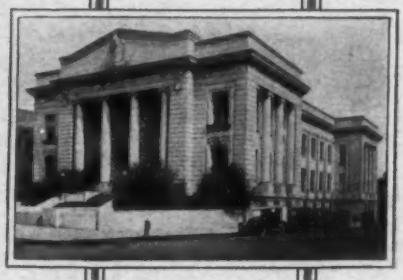
This shows the necessity of having soft pure water in a bleachery and dyeworks or a soap making plant and also the great advantage of using a soap possessed of a high degree of hydrolyzing power.

To possess cleansing properties, soap must be in solution and must lather well. The calcium and magnesium soaps are insoluble in water and by reducing the lathering power of a soap solution not only cause direct, but also indirect waste. For one gallon of pure water about 10 grains of soap are necessary to produce a lather. If the equations given are studied it will be seen that each degree of hardness will make it necessary to add at least six grains of pure soap to produce a lather while with commercial soaps the quantity is nearer 10. A water of 35 degrees of hardness will require 350 grains per gallon, or one pound for every 20 gallons. Magnesium hardness differs a little from that due to calcium, in that it is rather slowly decomposed by soap, and therefore is more dangerous.

The calcium and magnesium soaps formed by hard water and imperfectly hydrolyzed soap are nearly all white when freshly precipitated but when dried they develop a yellowish or brownish color, the depth of which depends upon the oil from which the soap is made. The magnesium soaps are more often deeply colored than the calcium. If, therefore, these soaps become fixed upon the fibers of the cloth, although when newly finished the goods will appear all right, they will often develop a color on keeping. This is more likely to occur where the hardness of the water is due to magnesium, both on account of the more marked

Shelby County Court House. Architect: G. M. Shaw. Roofer: Bartholomew Roofing Co. Gen'l Contr.: John Pierce Co., Chicago, Ill.

Barrett Specification Roofs



All over Memphis, Tenn.

IT is safe to say that no other feature of permanent building construction is so nearly standardized as the roof. For whether the building is of stone, terra cotta or brick—whether a public or a commercial building—if it has a flat roof-deck the chances are it is covered with a Barrett Specification Roof.

Take Memphis, for instance: The handsome court-house, the police station, the leading wholesale dry goods house and the principal automobile establishments are among the many buildings covered with Barrett Specification Roofs.

This general preference for Barrett Specification Roofs is due to their economy—the economy of low cost combined with long service.

In a Barrett Specification Bonded Roof the owner not only gets a roof that has proved its superior economy on thousands of buildings, but he also gets a roof that is bonded against all upkeep expense.

Before specifying or closing contract for a Barrett Specification Bonded Roof, be sure to read carefully all the stipulations in the specification.

The Barrett Specification Type "AA" 20-Year Bonded Roof represents the most permanent roof-covering it is possible to construct, and while we bond it for twenty years only, we can name many roofs of this type that have been in service over forty years and are still in good condition.

Where the character of the building does not justify a roof of such extreme length of service, we recommend the Barrett Specification Type "A" Roof, bonded for 10 years. Both roofs are built of the same high-grade waterproofing materials, the only difference being in the quantity used.

Full details regarding these Bonded Roofs and copies of The Barrett Specification free on request.

Central Police Station. Architect: G. M. Shaw. Roofer: Bartholomew Roofing Co. Gen'l Contr.: James Alexander Const. Co., Memphis, Tenn.

(Above) Overland Motor Car Company Building. Architect: G. M. Shaw. Roofer: Bartholomew Roofing Co. Gen'l Contr.: S. Malkin, Memphis, Tenn.

(Lower left) Wm. R. Moore Wholesale Dry Goods Co. Building. Architect: G. M. Shaw. Roofer: Bartholomew Roofing Co. Gen'l Contr.: Murch Bros., St. Louis, Mo.

(Below) Ford Motor Company. Architect: G. M. Shaw. Roofer: Bartholomew Roofing Co. Gen'l Contr.: James Alexander Const. Co., Memphis, Tenn.

The Barrett Company

New York	Chicago	Philadelphia	Boston	St. Louis	Cleveland
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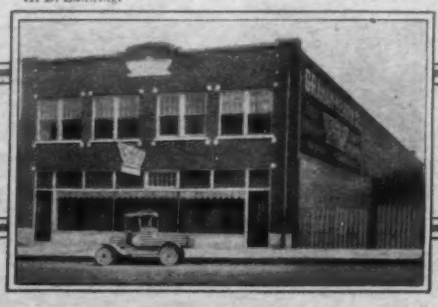

color of the magnesium soaps and also the comparative slowness with which magnesium hardness is decomposed by soaps.

The gradual decomposition of the fixed lime and magnesia soaps of oils whose fatty acids have a distinctive smell, such as cotton seed or soy bean oil, is often accompanied by the odor of the oil. Rosin soaps always tend to develop color and therefore soaps containing rosin are particularly unsuitable for hard waters. In fact only those soaps whose fatty acids are of a light color should be used, but with a soft water many cheap colored soaps are comparatively safe. It nearly always happens that the chief point at which these soaps are deposited upon the fabric is in the washing after the soaping or boiling. When a fabric has been scoured in soap the last remaining traces of that soap should be thoroughly rinsed out.

By the light of the foregoing remarks it is easy to see what happens when this washing or rinsing is carried out in hard water. The soap, instead of dissolving and being removed by the water, is decomposed and deposited as lime and magnesia soap in the fabric. The fabric quickly "appears" to be quite free from soap, since very little can be removed, but it has in reality lost very little. One can always tell the difference between goods soaped in hard and soft water, by analysis, even if they do not show superficially, for the former contain from 0.3 to 0.5 per cent of fixed fats while the latter will contain a mere trace.

If hard water be used in conjunction with a soap of a low hydrolyzing power it will in the presence of sodium hydrate form lime and magnesia, these in turn will fix their equivalent of fatty acids as insoluble soaps in the fabrics, and the latter can only be removed by decomposition with acid. This is the one reason why goods are soured always after the lime boil and also why the lime boil and sour followed by a soda boil is so much more efficacious in bleaching than the caustic one boil system without souring. By way of an example, we may say that two equal quantities of cotton goods were boiled in a soap solution, in one case the soap liquor was made up with distilled water and in the other with water containing 40 parts of hardness per 100,000. At the end of four hours the fat removed was estimated. The results showed that 23 per cent more fatty matters were removed from the cotton by the distilled water boil than by the hard water boil. Hence we may see the great advantage of a soap that hydrolyzes readily; in the example, if the soap had been of such a character as to hydrolyze 23 per cent more effectively it would to a large degree have prevented the formation of the insoluble soap. Again, on the other hand, we see the harmfulness of using hard water in bleaching or anywhere soap is used. I might say here that there is no doubt in the mind of the writer that soft water is far better than merely softened water since many neutral salts such as sodium chloride and sulphate, if present in any quantity, have a retarding effect on saponification (hydrolysis).

The Detergent Power of Soap.

There is no doubt that the detergent action of soap depends upon a combination of both chemical and physical causes; one of the best accepted and oldest theories is that the action depends entirely on hydrolysis, the cleansing action being due to the saponification of grease caused by the liberated alkali. The solution of the grease, as soap, then liberates the dirt from the fabric. This may be an important factor but must be considered only as a factor, because, in the first place, the quantity of alkali liberated would be too small to saponify the grease present, and the solution would be be too dilute to possess much saponifying power. Then again, more alkali is liberated from dilute than from concentrated soap solutions; but in practice the best results are obtained from concentrated soap solutions. Unless boiled water be used, the liberated alkali will usually become changed into carbonate by the carbon dioxide present. Carbonate of soda has very little saponifying value, though it is an emulsifier and it may in this way aid the soap in removing mineral oil. The removal of mineral or unsaponifiable oil is quite unexplained by the hydrolysis theory. Another theory depending on hydrolysis is that the active agent is a basic soap formed by hydrolysis with water.

The typical physical theory is founded on the phenomenon of "Brownian" movement or "pedesis." When finely divided insoluble particles are suspended in water and observed under the microscope they will be seen to be constantly oscillating; this motion is known as "pedesis," the presence of soap increases the rate of this movement just as other bodies, such as sulphates, retard it. According to this theory of cleansing, the soap and liberated alkali first saponify or emulsify the envelope of grease which causes the particles of dirt to adhere to a fabric and thus liberates the dirt. This, if sufficiently large or only attached to the surface, is now removed by gravity. If, however, the particles be very minute and entangled within the fibers of the cloth, gravity alone will not remove them; as soon as they are freed from their enclosing greasy envelopes they commence to oscillate, the rate of oscillation being accelerated by the presence of soap, and thus they gradually become removed from the fabric. If this theory is correct, a knowledge of the bodies which either promote or hinder pedesis is of great importance. Caustic soda in small quantities, sodium silicate and carbonate and soap are the chief assistants, while sulphate and chloride of sodium, calcium or magnesium salts, glycerol and other alcohols exercise a marked retarding effect.

It has been found by experiment and proven beyond doubt that sodium sulphate or chloride require to be present in considerable quantity to appreciably interfere with the hydrolysis of soap, in most cases at least, as one per cent solution is necessary. This is much above the quantity likely to be present either in the water, or as an impurity of the soap itself. On the other hand, quantities of sodium sulphate which are insufficient to inhibit hydrolysis have a marked effect on the scouring power of a soap. For instance, in one experiment two equal quantities of the same cotton were boiled with soap solutions to which, in one case, one per cent of sodium sulphate had been added. After boiling, the cottons were thoroughly washed, dried and weighed. It was found that while the soap alone removed 2.13 per cent of the fats, dirt, etc., from the cotton, in the presence of the sodium sulphate only 1.12 per cent of the fat and extraneous matter was removed. These experiments indicate that hydrolysis has very little to do with the *scouring* action of soap, but that pedesis is an important factor.

It has been maintained by some demonstrators that the cleansing power of soap is chiefly, if not entirely, due to its power of forming emulsions, this property being per-

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haps due to the low cohesion of the soap solutions, coupled with their low surface tension. In this way a lubricating effect is obtained in addition to the emulsification.

The detergent action of soap is sometimes attributed to the formation of absorption compounds between the soap and the dirt, which are more stable than those existing between the cotton fabric and the dirt. These absorption compounds being unstable in themselves are decomposed and washed out by an excess of water.

This is called the colloidal theory and is supported by the impossibility of cleansing many fabrics without the aid of combined rubbing and soaping. The effectiveness of this operation is most marked after the usual solvents have been applied and have failed to remove the matter entangled in or adhering to the fabric. Thus, in many cases, no grease can be left, so that we must be dealing with some phenomenon of physical solution.

Almost any fatty substance can be used in soap making, but the choice is naturally restricted by the price of the fat and also the quality of the soap desired. The most important animal fats are those of beef and hog products and of the vegetable oils, cotton seed, olive and cocoanut. It is also to be remembered that rosin, though not a fat, is important in soap making.

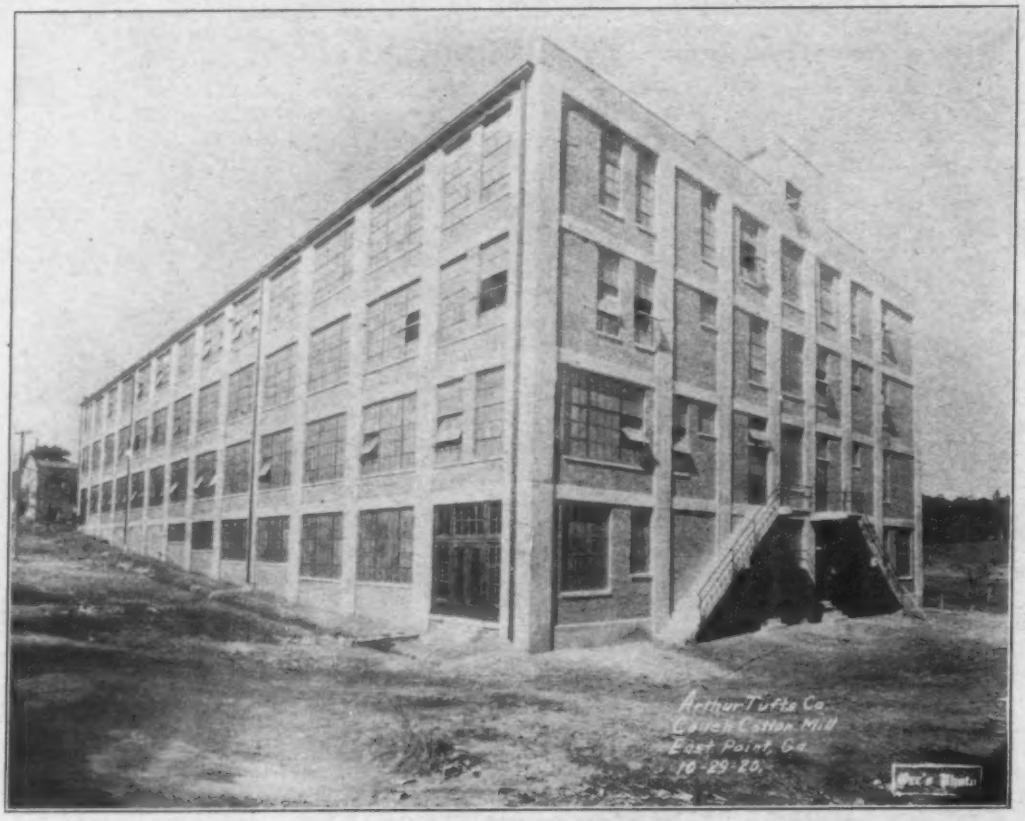
When pine wood is heated in a still or a current of steam, water and turpentine are driven off, and the residue, after further heating, is known as "rosin." It forms a yellow or brown transparent solid mass which is very brittle and has a melting point varying from 70 to 140 degrees Centigrade. It burns, when heated, with a yellow smoky flame, and produces a characteristic smell. It dissolves readily in alcohol, and the solution has an acid reaction, and is capable of being neutralized by an alkali, like a solution of a fatty acid. The chief constituent of this solution is abietic acid, $C_{44}H_{66}O_4$. This is a monobasic acid which, when neutralized by soda or potash, forms neutral salts having the properties of an ordinary soap. Thus they have a strong detergent and lathering action and can be salted from their solutions. With mineral acids they are decomposed, the rosin acid being liberated. The soaps are also decomposed by solutions of heavy metals. In addition to acid, rosin always contains unsaponifiable matter, varying in amount from 1 to 15 per cent.

Rosin soap is generally made as required by boiling rosin with soda ash until dissolved.

Rosin soaps have a very marked detergent and lathering powers and are for this reason often added to ordinary scouring and washing soaps, they play a very important part in some English bleaching systems where they are used in the lye boil after liming.

[This is the first of a series of articles on soap. Others will appear in later issues.]

Lockwood, Greene & Company, engineers, 60 Federal St., Boston, Mass., with offices in Atlanta, Cleveland, Detroit, Chicago, Charlotte, New York and Philadelphia in this country, as well as in Montreal, Canada, Paris, France, and Santiago, Chile, have recently issued their usual wall calendar for 1921. This is on heavy plate paper and shows photo-engraved reproductions of some engineering projects designed by and erected under the supervision of this organization.



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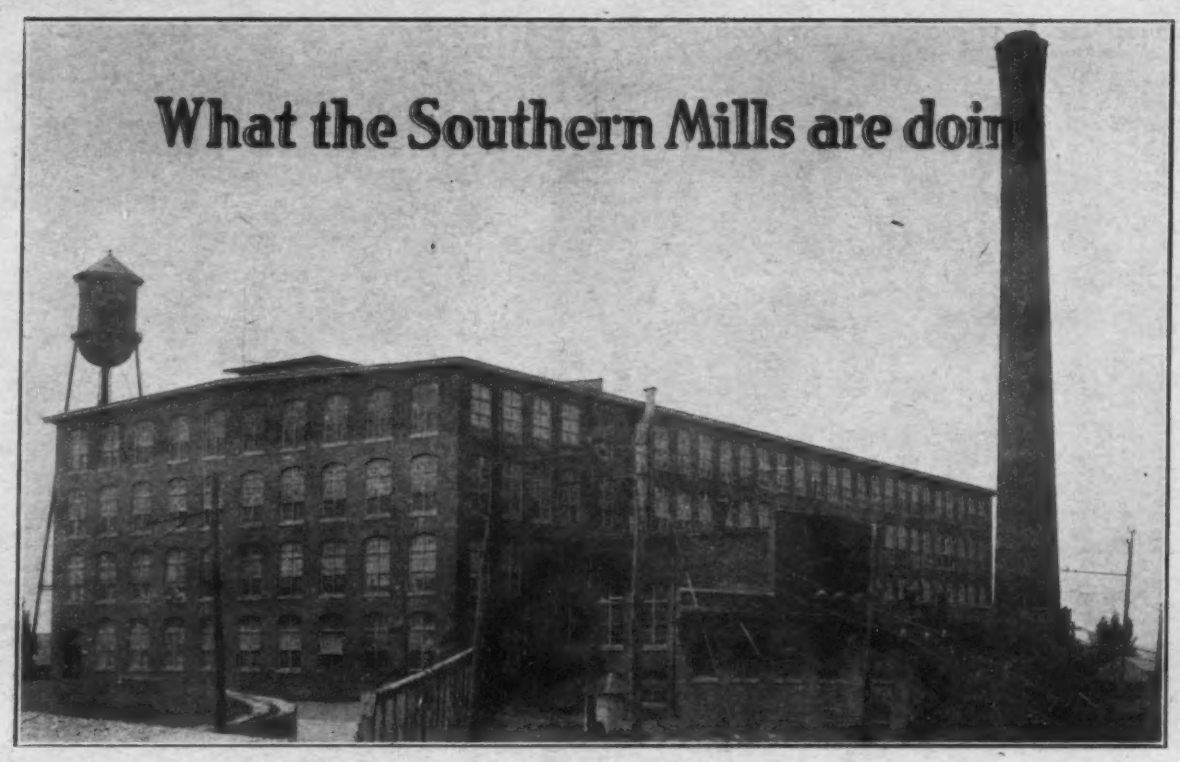
What the Southern Mills are doin



CHIQUOLA MANUFACTURING COMPANY, HONEA PATH, S. C.

Improvement in business conditions among southern mills gained momentum during the past month and it is conservatively estimated that curtailment among Georgia mills at the end of January was not more than 10 or 15 per cent. Other southern states are probably doing quite as well, except in some individual instances where special conditions or a special product has tended to hold a mill back in the advance.

Carded yarns and piece goods are showing the quickest recovery with the combed yarn division preparing for the business that now shows some signs of a return to normal. Reports of mills starting up or increasing their running time have occupied much space in the newspapers during the month, and the improved market conditions, coupled with the improved credit conditions, is rapidly bringing the textile section of the South back to normal.

Announcement was made last month that the 25th Silver Jubilee Convention of the American Cotton Manufacturers' Association would be held in Philadelphia on May 30 and 31. Since that time, President Allen F. Johnson and the Board of Governors of the Association have decided, in order to avoid holding a meeting on May 30 which is national Memorial Day, to advance the dates of this Silver Jubilee Convention to Friday and Saturday, May 27 and 28, at Philadelphia. Secretary Adams advises that a very attractive program is being arranged and the indications now point to a very large attendance.

At a tentative meeting of the arrangement committee held recently in Atlanta, May 13 and 14 were selected as the positive dates for the meeting of the Southern Textile Association in Atlanta. The Piedmont Hotel has been selected as convention headquarters, and the meetings will be held in the auditorium on the ninth floor of that hotel.

The Gattie-Goodyear Company, Greenville, S. C., has been organized. Its capital is $450,000, and the officers are: Joseph Gattie, president; Edward H. Farr, vice-president; and Chester Goodyear, manager.

The Meritas Mills, Columbus, Ga., have purchased a tract of 75 acres of land which they will develop as a mill village property. The plans call for the installation of waterworks, sewers, street lights and the construction of streets and a number of houses. A community building will also be erected.

The Laurens Cotton Mills, Laurens, S. C., have been authorized to increase their capital stock from $350,000 to $1,250,000, or an advance of $900,000.

The Bibb Manufacturing Company, which controls a large number of spindles in Georgia, recently increased its capital stock $1,500,000, making the company's common stock total $7,500,000. This increase is said to be for the purpose of further developments by the company at their various plants.

The Premier Manufacturing Company, Tuscaloosa, Ala., has just been organized with C. G. Harmon as president.

Because of a lack of demand for its products, delayed arrival of manufacturing equipment, a stagnant market and a resultant inability to consummate arrangements for meeting maturing obligations, it has been decided to place the affairs of the Jobbers Overall Co., Inc., of Lynchburg, Va., with its subsidiary, the Blue Buckle Cotton Mills at Rock Hill, S. C., in the hands of a committee of bank and merchandise creditors. This committee will work with the corporation in evolving plans for a readjustment of the business.

At a recent meeting of the creditors of this corporation, facts were presented which indicate the complete solvency of the business. The organization was hampered in meeting its obligations because of the fact that much of its assets were in the form of finished merchandise, not readily

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convertible into cash under prevalent conditions. The corporation sometime ago acquired controlling interest in the Blue Buckle Cotton Mills Company and a mill for the manufacture of denims to be made later into overalls was erected. The cost of this project was said to be approximately $3,000,000, which exceeded the original estimate by about $1,500,000. After the building was erected, it was stated, there was considerable delay in the delivery of the manufacturing equipment and when it was finally installed the parent company had on their hands an amount of finished material which, because of a falling off in demand, could not be disposed of and maturing obligations could not be met. It is stated, however, that with the coming of spring—the season when the demand for overalls reaches its height—it will be possible to merchandise this stock without undue sacrifice. The creditors' committee is now working upon plans for a readjustment of the business which will hold it over until such time as it will be on a sound financial basis.

It is reported that W. B. Davis & Sons have purchased the grounds at Fort Payne, Ala., formerly used as fair grounds and are considering the erection of a new yarn mill.

The Consolidated Textile Corporation, with southern headquarters at Greensboro, N. C., has retained E. S. Draper, landscape architect and city planner, Charlotte, N. C., to make a complete report and outline for improvements at a number of their southern mills, including the Henderson Division at Henderson, Ky., the Union Division at LaFayette, Ga., the Lynchburg Division at Lynchburg, Va., the Pilot Division at Raleigh, N. C., and the Ella Division at Shelby, N. C.

The Coosa Manufacturing Company has added 18,120 spindles and 24 sets of cards to their equipment at Piedmont, Ala.

Among the mill construction at Gastonia, N. C., which, according to present plans, will be completed during 1921 are the following: Arkray Mills at a cost of $300,000; Priscilla Mills at $350,000; Shuford at $75,000; Adams-Spencer at $100,000; Flint Mfg. Co. No. 2 at $200,000.

Wateree Mills, Camden, S. C., will add 420 looms, individual electric drive. An additional generator has been ordered.

The Broad River Cotton Mills, Blacksburg, S. C., has increased its capital from $150,000 to $227,000.

Plans are rapidly assuming definite shape for the basketball tournament of the Southern Textile Athletic Association, which will be held in Greenville, S. C., on February 24, 25 and 26. It is stated that upwards of 250 persons will attend to take part in the events. Two brass bands will also be in Greenville, it is announced. Representation in the tournament from a large number of southern mills is anticipated.

The Lawrence Cotton Mills, Durham, N. C., have added 10,000 spindles to their equipment. This mill manufactures 20s to 30s two-ply yarns.

The Grove Cotton Mills, Gastonia, N. C., will expend about $100,000 for plant improvement.

It is announced that the Watts Mill, Laurens, S. C., have built a new opener room and added 17 combers, two sliver lap machines and three ribbon lap machines.

The creditors of the Marlboro Cotton Mills, Inc., McColl, S. C., have voted to grant the concern an extension of one year. It was recently disclosed that the firm owes approximately $2,500,000, though the total assets are considerably in excess of the liabilities. It was pointed out that this mill sold goods to more than 20 tire manufacturing concerns, amounting to $3,800,000, and that the necessity for asking an extension developed when these tire companies held up deliveries. It was stated by a representative of the creditors who personally visited these tire manufacturers that they are now ready to accept deliveries from the mills and will carry out their complete contracts. The creditors of the mill expressed themselves as satisfied with its condition and will cooperate in every way with the mill management. It is believed that under the year's extension arrangement all claims will be met in full.

The New England Mill Situation.

The revival in the cotton goods industry of New England has made very rapid progress in the past month. At Fall River, 25 corporations' mills were running full time by the end of the month, while at the beginning, not one was operating on the regular schedule. There are still many idle mills and there are numbers of plants that are still running short handed. The finishing plants are operating about 50 to 60 per cent, which is a very sharp gain from the lowest level reached in years.

The mills that were engaged fully on tire yarns or other supplies for the automobile trades are the ones that are not yet feeling the effects of revival. Numbers of mills running on combed yarns are unable as yet to secure a volume of business that is sufficient to warrant them in attempting to open, and in most instances in attempting to increase their working time. The very great expansion during the war period in mill equipment designed to meet the special needs of the automobile industry was thought by many observers to be more or less ephemeral, or at least risky, and the long time taken in getting the industry back to normal was not unexpected by many experienced cotton manufacturers. That all the equipment will eventually be needed again is not doubted, but the experience of 1920 has taught many hard lessons, the most difficult one being the readiness of automobile factors to cancel or defer their orders without ordinary mercantile consideration.

The knit goods industry has also been slower in getting back than the cloth mills, while the long delay in rehabilitating the woolen industry has had much to do with the troubles in getting some of the cotton mills started again. They depend upon trade in cotton linings, cotton yarns for wool goods warps, etc., and it is only within a week or two that the clouds have begun to lift.

The fine goods industry was slower in getting back than the print cloth mills. At the present time they are employed to fully 60 per cent capacity with a prospect of a steady gain from this time forward. The chief difficulty has been in the inability of converters to sell their finished goods freely, or at prices that would induce them to undertake long contracts for gray cloths while finishing costs remained so high in relation to cloth prices. While cloth values dropped from 60 to 70 per cent from the top values of last year, finishing prices did not come down more than 25 per cent, and even that was not accomplished until new wage scales became effective about the first of this year. The finishers are still contending with very high coal and

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supply costs and downward changes in those come very slowly.

Throughout the long depression the cotton machinery plants maintained a larger relative output than the mills. This was due in several cases to the foreign orders in hand for which payments were provided in this country before the work was undertaken, and also to the fact that some substantial orders in hand were provided for out of reserve accounts that were charged off in the course of the year as necessary additions or renewals. The shops have been undergoing a pruning in labor costs resulting from a better supply of labor and much less friction with employees. This has encouraged some of the managers to make special efforts to keep moving.

The gingham mills were able to get back more quickly than some others. The price reductions made by the Amoskeag Company just before the end of December were of the most thorough character and went to the root of the low prices at the psychological moment. The process was painful enough in the matter of losses on production but the volume of business secured did much to bring about full operations in the gingham departments, and thus led to opportunities to readjust many labor costs throughout the plants.

Competitors naturally found much fault with the drastic and sweeping reductions but within two weeks they were convinced that buyers were instilled with a confidence in values that had been lacking for nearly six months. Progress in getting business was rather better with some mills than others but on the whole the final cutting of prices and recognition of the merchandising appeal for low and settled prices brought about the stability and confidence required. The mills making wide sheetings made savage reductions when they finally started and it did not take long to develop orders that would have been placed in December if merchants could bring themselves to feel sure of the future.

In connection with the radical cuts of prices made by New England mills, it ought to be said in all fairness, that the policy was prompted in part by a desire to end the demoralization that prevailed in cotton markets. Several of the oldest and most conservative cotton manufacturers did not find comfort in the depressed values of raw cotton. They believed that a most uneconomic condition was being created, not only for the cotton grower, but for the country where such a large part of the world's cotton supply is obtained. They believe the consumers of cloths are amply able to pay on a basis of 15 cent cotton for the next several months at least and in making cloth prices they hoped to receive encouragement in cloth orders that would enable them to buy cotton ahead of their immediate needs.

That mills have been buying cotton more freely is now well known and while there is by far too much uncertainty in the world's financial conditions to warrant long time purchases, the figures of the next few weeks are likely to disclose more cotton buying than has been generally appreciated. While the farmer will be helped, the real gainer will be the mills whose prices have been stabilized for two or three months to come.

The volume of business done in print cloths has been the largest in five months. The large printers supported the print cloth market from the time it went down to 7½ cents and bought steadily as it rose to 8¼ cents for 38½ inch 64 x 60s. Buying on the part of bleachers and converters ran the price up to 9 cents from which it slid back to 8½ cents. The prices put on percales were exceedingly low, a basis of 11¾ cents being established on American Scouts. There has been a rise since then of fully 1¼ cents a yard, but the great bulk of the business on printed fabrics was taken at the lower price. The printers are now comfortably supplied with business on percales and other goods for the next 60 days, the three larger factors, the Pacific, American, and Algonquin, being operated on full time.

The job printers have been getting more business steadily but not in such a spectacular way as the printers of percales. They have taken in many voiles, lawns, and organdies to be printed early for this season and there has been considerable business done on the better qualities of fine shirtings, printed. Orders have begun to come forward more liberally on sateens, twills, and other lining fabrics, the job printers doing most of the work done on cloths of this description. There has also been considerable business placed with mills making fine woven shirtings although the orders have not been of the extraordinary character seen after the armistice.

A better demand has been springing up for piques, bedford cords, and other heavy cloths for piece dyeing and for white goods sales. The volume of business on cotton cloths for printing having been run out of stock in consequence of the severe depression in silks that began just about a year ago. Many silk filled dress fabrics are being made again, and the usual run of silk shirtings for the select trade is being offered again.

New England cotton manufacturers as a whole are not expecting a boom in trade at this time. They are hoping to see a continued demand that will give mills cause for attempting to run in full. They point out that improvement has not yet become broad. For example, cotton duck is very slow, and the cotton blanket and napped goods for fall would have been priced before this time. This year the jobbers are stocked and are not ready to buy for long term delivery. The openings of many napped goods lines such as blankets and fancy domets, may be postponed until well into March. It is also plain to manufacturers that the buyers who have come forward thus far have been attracted very largely by the low prices and by the opportunity to re-start their own business on new and low price levels.

There are some broader fundamentals that the financial men in the cotton goods industry talk about that indicate why they are not prepared to see a very large movement at very high prices. They do not want a tariff that will exclude foreign productions in countries that owe a great deal of money here, and they do not want to lose any part of what has been gained in foreign trade in cotton goods. For this moment the export demand is not large but the fact confronts the cotton industry that for five years, the exports have taken up nearly 10 per cent of the output in many lines of fabrics. If these outlets are to be closed it follows that increased competition for a market at home is inevitable, and that will mean an unprofitable condition for some time.

Another factor talked about is that this country's industries in textile lines have made a quicker readjustment to attractive price levels in labor and values than the industries of England, our largest competitor, and this gives

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a better prospect of being able to maintain a foreign trade that several New England mills have found profitable.

Cotton Comment.

H. AND B. BEER.

New Orleans, January 24th, 1921.

Deflation and liquidation having run its course in cotton goods and raw cotton, the lowest prices for spots being witnessed during the last days of December, there came a change for the better with the opening of the new year. Accordingly prices advanced sharply in consequence of improving trade buying, and the result of mills resuming operations in America, but part of the rise in values was lost on account of Manchester trade advices remaining unfavorable.

While there has been no improvement of consequence in trade conditions in England, there has been a decided improvement in the textile situation in the United States. The cotton mills on this side of the Atlantic were first to resume activity, gaining momentum as time elapsed. Now the woolen mills are opening for work, to be followed soon by the operating of large automobile plants next month. Therefore, so far as the United States is concerned, the resumption of industrial activity is a reality and promises to expand in the future until normal conditions are reached.

In Europe the outlook is not so encouraging, yet is hopeful, as is indicated by the present strength of foreign exchange and foreign government securities. The advance in foreign exchange is partly due to the revival of the U. S. War Finance Corporation and the recent formation of several private export organizations, which will provide increasing credits to foreign interests for the purpose of reviving foreign trade.

Meanwhile the Reparation Commission of the Allied governments is now in session in Paris with the object of endeavoring to reach an agreement with Germany as to the indemnity to be placed on Germany. If an agreement is reached between the Allies and Germany as to the terms and size of the war indemnity, its beneficial effect on the markets is likely to be spontaneous and far reaching, as it would tend to improve international politics, finances and trade conditions. Thereafter the road would be made easier for the restoration of peace between the United States and Germany, and after peace between America and Germany is established, the U. S. War Finance Corporation will be in a position to extend credits to German interests for the purpose of fostering trade.

American mill stocks at the close of December were only 1,258,000 bales vs. 1,836,000 last year, of which southern mills held only 630,000 against 1,116,000, northern mills 629,000 vs. 721,000.

In view of the fact that American cotton mills, North and South, are now running, full time in many instances, some night and day, it is only a question of a short while when the demand for spots will revive.

When the spot demand does revive it will likely be difficult to make large purchases of raw cotton except at higher prices owing to the tenacity with which the interior is holding to its cotton. This holding fast to cotton by the interior factors is due to the intention to make a radical reduction in the acreage at planting time, which, they realize, is their only salvation.

The Indian crop, now being marketed, is estimated to be only about 3,800,000 bales vs. 5,800,000 last year, and the Sultan of Egypt has issued a decree for a reduction of one-third in the acreage of that country this year.

Under the circumstances it would seem as if market is due to be higher, perhaps much higher, eventually. Therefore, the present offers a favorable opportunity for American mills to stock up with raw cotton, while prices are low, for their future requirements.

Advices from Texas are to effect that preparation for the next crop are far behind normal, and reports from the eastern half of the belt tell of preparations there being nil.

World Cotton Conference.

The World Cotton Conference, which is to be held in Manchester and Liverpool, England, June 13 to 22 inclusive, bids fair to surpass any previous gathering in the history of the industry, not only in point of attendance, but in the scope and importance of its work. Arrangements are rapidly taking form for a program which will be of vital interest to all engaged in the production, handling and manufacture of cotton and its products.

The sessions of the first three days of the Conference, June 13, 14 and 15, will be held in Liverpool. Hotel accommodations for the visiting delegations have been arranged for at the Adelphi Hotel at this place. After these sessions, the delegates will proceed to Manchester, where the remaining sessions of the Conference will be held.

It is pointed out that this, the second World Cotton Conference, will exceed in value even the first Conference, held in New Orleans in October, 1919, which was a distinct success, inasmuch as this year's Conference will bring to its task a more perfected organization. There will be committees whose plans will have been definitely outlined and carried out, and an enthusiasm born of the knowledge of the power of coordinated efforts, demonstrated at New Orleans, and a desire on the part of those interested to develop a greater cooperation, believing that the welfare of each unit in the industry is best served by that which benefits the industry as a whole. The relations which were established through mutual intercourse and personal contact at New Orleans will be renewed, and it is expected that every one will apply himself to the amelioration of many of the problems which face the industry.

Arrangements for the pleasure and enjoyment of the delegates have not been neglected, and the plans indicate that the last day at Liverpool and two days during the Manchester meeting will be devoted exclusively to entertainment.

It has been announced that Lord Emmott has consented to preside at the World Cotton Conference in place of the late Sir Herbert Dixon who was elected president of the Conference at New Orleans in 1919 but whose death occurred during the latter days of 1920.

Henry L. Mulligan, 10 Congress St., Boston, Mass., has been designated as official transportation agent for the occasion. First-class accommodations for a large delegation have been arranged for on the S. S. Adriatic, which will leave New York on June 1.

Notes About Men You Know.

R. C. KENDALL.

R. C. KENDALL is in charge of the branch office of the Link-Belt Company, recently opened at 707 Citizens and Southern Bank Bldg., Atlanta, Ga. Mr. Kendall has been in the employ of the Link-Belt Company for a number of years and has been directly connected with the silent chain department for the past three or four years. He comes to Atlanta from Indianapolis, where he has had charge of the silent chain office. He is an experienced drive chain engineer and is capable of taking care of any demands for Link-Belt silent chain drives. The Link-Belt Company has opened the Atlanta office for the purpose of giving their many friends and customers, both new and old, better and quicker service.

C. B. ARMSTRONG, president and treasurer of the Armstrong group of mills, one of the largest chains of cotton mills in the South, died at his home in Gastonia, N. C., on Sunday night, December 26, following an illness of several weeks. Colonel Armstrong began his career as a cotton manufacturer about 10 years ago, purchasing at that time the Monarch Mills, at Dallas, N. C. He steadily increased his holdings until he had built up a chain of thirteen mills. Of these he built five, having acquired the others by the purchase of existing plants. The mills in the Armstrong chain are the Armstrong, Clara, Dunn, Mildred, Mutual, Piedmont, Seminole, Victory, Winget, High Shoals, Helen, Monarch, Lockmore and Wymojo.

The Mutual Cotton Mill, which Colonel Armstrong built several years ago, is a unique one in that 49 per cent of the capital stock is held by the operatives of the mill. Colonel Armstrong arranged for the workers to pay for the stock on an easy plan and the operatives have enjoyed a steady return from their stock.

Colonel Armstrong was 59 years of age, and is survived by his widow and six children. Besides his mill interests, Colonel Armstrong was interested in a large number of other enterprises and was one of the most prominent men in his section of the country. He served as sheriff of Gaston county many years ago, and had also served one term as mayor of Gastonia. He also evinced great interest in education and religion.

C. C. ARMSTRONG, of Gastonia, N. C., son of the late C. B. Armstrong, head of the Armstrong chain of mills, has been elected to succeed his father as president of the Seminole, Monarch, Mutual, Mildred, Armstrong, Clara, Dunn, Winget, Victory and Piedmont Spinning Mills.

A. G. MEYERS was elected vice-president of these 10 mills and also president of the High Shoals Mills.

W. RALPH ARMSTRONG, another son of the late C. B. Armstrong, has been elected president and treasurer of the Wymojo Yarn Mills and the Helen Yarn Mills, Rock Hill, S. C., and the Lockmore Cotton Mills, at York, S. C., to succeed his father.

HARRY H. RICHARDSON, who for some time has been superintendent of two of the B. B. & R. Knight Mills, the Manchaug Mill at Manchaug, Mass., and the Clinton Mill at Woonsocket, R. I., has resigned to accept a position with the Aldrich Manufacturing Co., at Moosup, Conn.

T. J. MCNEELY has been appointed superintendent of the Lawrence Cotton Mills, Durham, N. C. Mr. McNeely was recently superintendent of the Meyers Mills, at Gastonia, N. C.

SAMUEL L. DEANE, formerly superintendent of the Ranlo (N. C.) Mills, has been made superintendent of the Denison Cotton Mill Co., at Denison, Texas.

W. H. LYNCH has resigned as superintendent of the Globe Mills, Augusta, Ga., and was succeeded in that position by J. E. Davis.

JOHN D. STRATFORD has resigned as secretary of the Roseland Cotton Mills Company, Lincolnton, N. C.

HERBERT W. CLARK, general manager of the Sutherland Manufacturing Co., Augusta, Ga., died recently after an extended illness. He was succeeded by his brother, C. C. Clark.

A. T. BAXTER has been made superintendent of the Gem Yarn Mill, Cornelius, N. C.

J. R. HANEY has resigned as superintendent of the Hartsell Mills, Concord, N. C.

W. E. GREEN has accepted the position of cloth room overseer at the Pacolet Mills, Trough, S. C.

A. R. BATES has resigned as overseer of the cloth room at the Montgomery (Ala.) Cotton Mfg. Co., and accepted a similar position with the Anniston (Ala.) Cotton Mfg. Co.

G. M. VANN has been appointed superintendent of the Eastman (Ga.) Cotton Mills.

W. A. REID, formerly superintendent of the Tifton (Ga.) Cotton Mills, has been appointed superintendent of the Pelham Division of the Consolidated Textile Corporation at Pelham, Ga., succeeding W. J. McDonald.

J. F. CUNNINGHAM has been appointed superintendent of the Rabell Manufacturing Co., Selma, Ala.

J. O. WHITE has severed his active connection as general manager and treasurer of the Hudson, Moore, Whitnel and Lenoir Mills at Lenoir, N. C., in order that he might devote more of his time and attention to the Modena and Morrowebb Mills at Gastonia, N. C.

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STRAIGHT LINE METHODS

How Other Men Manage

Practical Discussions by Cotton's Readers on all varieties of Mill Subjects

A Twisting-in Record.

EDITOR COTTON:

Twisting-in is of great advantage to any mill where the warps which are put into the looms are the same as those which are running out, and which are called replacements. It is of course cheaper to have this work done by the piece than by the day but, in either case, it is desirable to have a correct record of each person's work. This can easily be done by preparing a twisting-in record as shown.

A card, printed the same as this form, about six inches long and about four inches wide, is all that is necessary. Each person doing this work should be given one of these cards in an envelope to carry in the pocket. At the top of the cord is printed the title "Twisting-In." Space is left on the dotted lines for the name of the worker and the department. This is followed by seven columns in which should be tabulated the following details:

The first column is for the different dates to show when the work is done. The next column is for the loom number, followed in the third column by the style of the goods, with the amount of ends in each warp twisted-in being placed in the fourth column. Another very important matter is the time of starting to twist-in a warp and the time of finishing each warp, which occupy the fifth and sixth columns. In the seventh column is to be placed the total number of ends per day, the eighth column being devoted to remarks.

TWISTING-IN RECORD

NAME ----------

DEPT. -----

DATE	LOOM Nº	STYLE Nº	ENDS	TIME STARTED	TIME FINISHED	ENDS TOTAL EACH DAY	REMARKS
TOTAL WARPS							
TOTAL ENDS							
TOTAL TIME							

PIECE RATE --------

TOTAL PAY ---------

We invite our readers to make use of this department for the discussion of any and all problems arising in the mill or the finishing plant. Questions, answers or letters need not conform to any particular style and will be properly edited before publishing. The editors do not hold themselves responsible for any statements of opinion or fact which may appear in this department unless so endorsed. This department is open to all.

With all of this information it is impossible for a person to falsify his record, and this makes the work record automatic. Each man can keep his own account. This avoids the necessity of having a clerk to follow up this work, and also gives the twisters-in the satisfaction of keeping their own record.

Having the loom number and the style of the goods on the card offers a self-checking system. Each section man will also report each night the warps replaced as a check on the twisters-in record.

The reason for entering the starting and finishing time on the card is obvious to the careful manager. The finishing time is not always the starting time of the next warp. The warper may have to wait for a loom to come out, or to wait for warps. He also may have some errands to do on his own account. These time enterings afford a check on the man's time. They serve also to show how long it takes to do various styles of work and enables the management to establish the piece work rate for other styles when they come up.

The system which works well or best is to have the twister-in put into the loom his own warp. After he has twisted-in his warp, he should start the loom and leave it in ready running order for the weaver. There are big advantages in doing the work in this way. If others put the warp in, the twister-in may claim irregularities which are out of place. If the twister-in does not start the loom, he may slight his work for the weaver. Both of these difficulties are automatically avoided by having the twister-in do this work himself. Of course, when the twister-in puts his own warp in he cannot twist-in so many ends. It will be necessary to pay him a higher rate per thousand ends in order to cover these extra duties.

It must also be taken into consideration that coarser yarns are harder to twist-in than medium counts. Very fine

work is also harder to twist-in than medium counts. It also makes a vast difference in the capacity of the worker as to whether he puts in a warp having only 1,200 ends, or one having 3,000 or more ends. With the lesser number of ends in the warp, the worker is spending more time putting warps into the looms than he is actually twisting-in.

Where a good twister-in puts in his own warps and starts the loom ready for the weaver after he has twisted-in the ends, he can twist-in about 6,000 ends per day or 600 ends per hour, providing the warps average about 2,000 ends per warp on about 30s yarn. If the twister-in does nothing but twist-in ends he can do 12,000 to 15,000 ends per day or 1,200 to 1,500 ends per hour, depending on the work. In order to ascertain the piece work rate, divide the total number of ends by one thousand and then divide the weekly wage by the number of thousand of ends twisted-in. Example: 60,000 ends twisted-in divided by 1,000 equals 60 which divided into a weekly wage of $18.00 would equal 30 cents per thousand ends. Proof: 60 × 30 cents equals $18.00. Another rule is to multiply the total number of ends by the rate per thousand ends, and then point off five places—two for cents and three for thousands, thus: 60,000 × 30 cents equals $18.00 per week.

At the bottom of the form is provided space for other items of useful calculations, such as the total warps replaced, the total ends twisted-in, the total time consumed on the work, etc. There are also spaces for the wage rate and for entering the total pay earned.

H. D. Martin (N. Y.)

Picking Operatives.

EDITOR COTTON:

In the December number of COTTON there appeared a letter on "The Employment Manager" by "K. F. (R. I.)" which I read with interest. "K. F." is correct in saying that the most successful mills and other establishments are installing employment departments for employing help. I have personally had the experience of selecting help and I know just what it means.

This is a new proposition in most mills, and I notice that the men who are engaged as employment managers are usually without practical experience in any of the departments of the mill. It is my opinion—and I am sure the readers will agree with me—that the head of the employment department should have a practical knowledge of all the various departments and operations for which help are employed. Otherwise, it is pure guess-work, and the employment manager cannot convince the applicant in case of a question as to what they are to do, or what they should do, or tell them anything concerning the nature of the work.

A form should be made out for the heads of the various departments throughout the plant, to be filled in by the department head, explaining in detail just what type of applicant is needed, and giving the standards to which the applicant must measure up; the form should then be returned to the employment manager.

The new recruit should be turned over to the foreman of the department for which he is hired, and the foreman should put him to work. The employment manager should not in any way interfere with the help in the plant without the knowledge of the head of the department. Doing this gives the new hand the opinion that the employment manager is of more concern than the foreman. In order to keep the respect of the help for their foreman or department head, even the management cannot be too careful as to how the foreman's authority is respected, as it is the department heads who get results for the firm. All department heads should cooperate with the employment manager at all times, and they should always work in harmony, one with the other.

By so doing, the labor turn-over would be greatly reduced—the aim of the firm is to curtail this expense—and measures created for which the employment manager is intended.

The employment manager is here to stay, and if the duties are properly performed he is a paying proposition. But, as stated, the experienced manager who has had practical experience is the most desirable and the most successful.

Bob (Iowa.)

Improving the Opener Hopper.

EDITOR COTTON:

In this, the second of a series of letters dealing with the elimination of troubles that exist in most mills manufacturing cotton yarn, I should like to draw—through the medium of words—a picture of unbalanced hoppers, etc., that so rarely receive even the slightest attention. I speak thusly, because if each one of us will but ask the question of ourselves, "Do I spend the effort and energy that I should in the development of my picker room?", the thundering "No!" that would resound through the world would be deafening.

In my first letter in the December number of COTTON, I referred slightly to the old-time mixing pile that once graced the floors of our opening rooms and which is now like our Indian race, nearly extinct. To the writer the thought is prevalent that while in the past the huge piles of blended and graded cotton were essential, and everyone will admit that the results of the method served our purpose very graciously, and while a great many of us would no doubt welcome its return under certain circumstances, still I think that the majority of the readers prefer the installation of the modern equipment. Personally I think that the very best results possible can be obtained with these modern openers if each person in charge would, if possible, sit in his opening room and study the following suggestions and apply them to his machinery, if for nothing else but experiment, I have no doubt it would repay him for his efforts.

An opener should be made to live up to its name. My estimation of an opener is a machine into which quantities of cotton can be thrown, and when the machine has performed its operation upon this bulk, we should find the fibers detached from the mass in such a fluffy, natural condition that even the merest slip of a child could deliver even yarn with little effort.

To obtain the best results from an opener I find that the slanting or gravity back gives the manufacturer the best and most even yarn. This slanting back is so arranged that the pressure of cotton is constantly against the upright spiked apron. The lower apron is removed entirely and the bars are arranged across the whole width of the opener hopper in such a manner that they resemble

New Export Problems

Mere order-taking in foreign trade has had its day. Though American shipments of foods, merchandise and materials over-seas continue large, exporters in every line recognize that the turn in the tide has come.

In future, goods that go abroad must first be sold. Customers must be sought, studied, served. Markets must be developed and connections formed on a basis of information and analysis even more exact than those required in securing business in the past.

In making contacts with unfamiliar markets—in keeping touch with changing conditions—in carrying out the financial or shipping operations required in over-seas transactions—the Irving's Foreign Service and Foreign Trade Divisions may be able to supply you with just the information, counsel or banking and commercial aid you need. For exporters—as well as importers—Irving service spans all seas.

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what might be termed a small hill for the cotton to slide upon. The lower ends of these bars are fastened into a slotted rack, built up from the inside of the hopper, that can be adjusted to within two inches of the points of the upright apron and from six to eight inches from the extreme lowest point of the spiked apron and up its face surface. The upper ends of the bars are set into a slotted holder and fastened in position by a binder plate running the entire width of the hopper tight to the bars. These bars are also set at intervals of 1/2 inch apart, thus allowing a small space for the leaf and seed and sand to fall to the floor. One would be surprised to see the results in foreign matter that is obtained by this manner of construction of these bars.

Of course, like a cylinder of a card in its operation on the cotton as it takes it from the licker-in, the spiked apron is constantly working upon the same action upon the bulk of cotton thrown upon this so-called tiny hill; always loading each pin to its own capacity—no more, for as each pin presents itself to the front surface of the apron it immediately imbeds itself into the mass of cotton pressing against it and when once the point is covered to its capacity it is impossible to make it take any more, and equally as difficult to make it release what rightfully belongs to it until they pass over the upper turn and are brushed off by the fan roll.

It is evident that by this change in the method of conveyance, every pin upon the surface of the upright apron carries its own load and its own load is as great as its length and strength permits and has the appearance of a surface dotted with evenly spaced tiny balls of snow. When the hopper is made to perform its labor in this manner its capacity can be determined by its speed and should be adjusted to this end as soon as possible. Formerly the apron was loaded but half and that with flakes from 3 to 12 inches wide; furthermore nine times out of ten there was a chance of seeing those flakes brushed off into the hopper only to climb again to the same place from which they were first removed, while with a gravity or slanting back properly adjusted in an opener hopper, the bulk of cotton pressing against the surface of the spiked apron will diminish as a snow bank in the hot sun and very seldom will a particle be thrown back into the hopper, for the pins carry but a small piece and the evener roll at the top of the apron is so arranged that its pins come between the rows or above the points and the beater or evener hasn't the slightest chance to remove any portions that are traveling by.

I will follow this process to the action of these small tufts at the feed roll in my next communication.

A. B. C. (R. I.)

United Chemical Products Corporation, York and Colgate Sts., Jersey City, N. J., have recently brought out a new sulphur blue known as Sulphur Navy Blue U C P Conc. 100 per cent, which gives identically the same shade as Indigo at a very low percentage. They have also gotten out several other new colors, Direct Brown G Conc., Direct Brown C Conc., Direct Brown R Conc., Direct Blue 2 B Conc., Direct Green B and G Conc. Also Direct Black, Sulphur Yellow G and a new Sulphur Black L and Sulphur Brown. Additional colors are Direct Blue 2 B, Direct Blue 3 B, Direct Brown R, Direct Brown G C Conc.

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Points on Towel Finishing.

EDITOR COTTON:

The preserving of the colored yarn in Turkish, huck and crash towels is the cause of the departure from the beaten path ordinarily used in bleaching piece goods when dealing with this class of product. Toweling must be well bleached, clean, white and absorbent, with a purity of shade, a color pleasing to the eye and a feel of fullness, resilient as a sponge.

To the end of acquiring these properties the cotton should be carefully selected and spun as free from trash and motes as possible. The twist should be as soft as good running will permit and the drafting all along the line should be short enough to make a full thread—even and not strained. Care taken in watching these points will assist in a high quality towel in the finishing room, make a good name for the mill and create a demand for the goods.

Oil stains are the source of as many seconds in towels as any other one thing. Regularity and thoroughness in cleaning the machinery by a crew in charge of a competent oiler, will more than save its expense in the absence of oil stains from the finished goods, which means less seconds, more profit and better deliveries on the calculated output of the looms.

The slashing or sizing of the warp must be done with starch and oils that are easily removed. I have tried various ingredients and have secured the best results from starch with just enough soluble sulphonated corn oil to keep the yarn from adhering to the cylinder, and to keep the cylinder bright. The warp sheds very little dust in the loom and has an elasticity which prevents the breaking out of ends in the weaving. I have had weavers, when paid by the pick, to run their looms at an average of 98 per cent, week in and week out, weaving several different patterns on their section.

In a mill where we were having trouble with oil stains on the goods, I made an investigation to ascertain the cause. In the spinning room we found, by a process of elimination, that the greatest number of oil stains showing up in the finished towel were on the filling. It was the custom in this mill, after doffing the filling frame, to weigh the yarn by emptying it into another box. Then that box was emptied into a bin from which the filling boxes were filled ready for the loom. This required a great deal of handling and a number of the bobbins often fell to the floor and gathered up considerable lint and oil while rolling around under the machines. The careless help put this yarn into the boxes which went to the looms and it was woven into the cloth. By putting a man from the weave room, who was interested in making a better product, in charge of the filling, and having him stop the handling of the yarn from one box to another and pack the filling from the doff boxes, we prevented a great deal of bad work. All dirty filling was sent to the foreman to be made into wrapping twine or rope.

It was the custom in this mill to blow off the looms at night, once a week, with compressed air. This gave the loom a clean appearance, but removed only the lint, smearing the oil and grease over the loom and in some cases spattering the warp with oil, which caused oil spots to show up later on the finished towel, making a selling loss, which of course reduced the profit to the mill.

The night cleaning was stopped. Two men were put to cleaning looms, each being given 300 looms to look after. Every time a warp ran out the loom was very thoroughly cleaned with hard waste. A canvas cover was fastened over the front roll to prevent the fixer's soiling the woven towel and we found it profitable to launder the loom fixers' overalls in the bleachery once or twice a week. This practice enabled us to eliminate more oil stains.

When the woven towel was cut from the loom it went immediately to the inspection room where it was weighed and measured. The tag from the loom, marked with the pattern number, loom number and construction, and giving in detail information pertaining to the particular piece of goods, followed the piece and as the inspector examined the cut she made notes of any imperfections such as heavy filling, oil spots, loose warp ends, overshots, bad selvage, etc. The head inspector measured the towels for length and width and every hour turned in to the weaving foreman the tags, showing how the work was running. These tags were checked up by the second hand or extra weaver to ascertain whether any trouble had been remedied. As each loom's work was kept on a separate record, the report to the foreman also showed whether a previous trouble was still causing bad work. It was not long before everyone was taking an interest in better work and all became bettter satisfied with their jobs.

After the towels had been inspected they were sorted out in piles, as to color and weight, ready for the bleachery. The bleachery was equipped to finish a kier of 5,000 pounds a day. We had one kier 13 feet deep and 8 feet wide. When bleaching red border towels two per cent of soda and one-half of one per cent chip soap were put in the kier. The towels were run through a washer, two ends at once, into the kier, plated down evenly, covered with duck and held down by chains. Water and steam were turned on and the goods were boiled for six to eight hours under five pounds pressure. The water was then run off and two changes of water given the goods. It required the work of two men for two hours to fill the kier. The goods were washed out from the kier two ends at a time through a series of tubs much like a four-box washer. We had trouble at first with the goods tangling, but soon overcome this by putting a chute, similar to a hay chute, in front of each roller. This kept the goods in place and gave enough slack between each tub to make the operation continuous. At the delivery tub were two overhead rollers delivering to two trucks. When a truck was filled the towel was cut where it was sewed together, the truck moved on and an empty truck put in its place without stopping.

All white goods were given a pressure of thirty pounds with two per cent caustic and one per cent soda ash. This was found to give a good boil-out and to remove all motes. In washing from the kier we put a gallon of sulphuric acid in the second box which contained about 500 gallons of water; thus the goods received a wash in acid to convert the soda and oils into sulphates which were more easily removed in the next two rinses.

The bleaching proper was carried out in large concrete cisterns divided into four compartments by concrete lattices, and holding 1000 gallons of water. All water was reduced to zero hardness by water softeners before use, and was set with a bleach made from liquid chlorine con-

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taining eight milligrams of active chlorine per ten c. c. of bleach liquor.

Two ends of towels were run into the tank over a reel, about 500 yards (two or three loom cuts) to each end, and as we had eight tanks there were two rows of four each. By the time one man had filled all eight tanks the towels were ready to be aerated by turning over the reel into the other compartment and the bath titrated to ascertain the chlorine content. More stock bleach was added to bring the bath up to the original strength and two more ends of towels were then entered for bleaching. The time required to bleach a good white in this way was approximately two and one half hours.

After this operation the goods were ready to be freed of chlorine. This was done by running the first two ends out over the overhead reel into trucks traveling on a concrete track on top of the tanks. The truck of towels was moved to the center of the four tanks and the two ends run out, first into a tank of water, and then into sulphuric acid for white and vat colored towels, and into muriatic acid for Turkey red towels, then through two rinses of fresh water.

The goods were next squeezed well, opened through a scutcher, starched with pure corn starch, a little talc and paraffin wax and then dried.

In the case of vat dyed yarn for borders the boiling-out must be more of a desizing operation and boiling-out with soap to keep the color from marking off. Where very delicate shades are used the boiling-out is dispensed with and the peroxide bleaching process carried out in the cement tank.

The bleaching of a kier of towels of approximately 30,000 yards in nine hours requires two men at the kier, two men at the bleaching tanks, one man at the washing tanks and one man at the scutcher, with one foreman or second hand. The chemicals required are equivalent to 3 per cent caustic, one per cent acid and about 60 pounds of liquid chlorine.

J. K. H. (Georgia.)

Dirty Floors and Fires.

EDITOR COTTON:

In a mill which I visited recently, I noticed the floor was very dirty and when I called the superintendent's attention to it, he said that clean floors never pay dividends. He is wrong. Fire is a loss, no matter how slight.

I have in mind a fire that caused a great loss, and a dirty floor was the cause. The fire started from a broken electric wire which conveyed the power to a motor. A few sparks fell to the floor, where owing to the dirty condition, the fire ran to a pile of laps and much damage resulted. Had the floor been swept, there would have been no damage.

I recall another fire that caused a loss because of a dirty floor. The slubber tender had the habit of laying the empty bobbins on the carriage a little before doffing time. On the day in question, one of the empty bobbins fell under the carriage. The slubber tender, instead of hunting for this bobbin, simply put on another. When the frame was started after doffing, the carriage of course made its full downward traverse, bringing the empty bobbin under the carriage into contact with one of the gears, causing a fire. The writer was an oiler at that time and was one of the first on the spot. While our attention was centered on the frame where the fire started, the fire, owing to a dirty floor, travelled between the cans, and we found to our surprise that slubber number two also was on fire.

I have seen fires in spinning rooms caused by a broken band which would have been a trifle had it not been for dirty floors.

Dirty floors make the help careless. When the floor is dirty, the help will add to it by throwing the clearer waste, etc., on the floor, and in some cases even stick waste. Get the floors clean and the help will help keep them clean.

Wash. (Conn.)

Cotton Ducks.

EDITOR COTTON:

I shall appreciate your running in an early number of COTTON an article showing the differences between shoe duck, army duck, enameled duck, flat duck, dress duck, numbered duck and any other kind of duck that is manufactured commercially.

A. M. (Ga.)

EDITOR COTTON:

In reply to the request of "A. M. (Ga.)" regarding cotton duck, this is a pretty general order since ducks cover a rather large field and are made under innumerable constructions and an almost infinite number of effects obtained according to the requirements of the customer. No standard requirements can be laid down, as these vary to such a large extent with the different users. Thus, the fabric desired may be hard, medium or soft; may be required to meet a strict test of breaking strength, or strength may be of secondary or of no importance.

In the heavier fabrics such as Balata belting and sail ducks, the requirements on width are very strict, a variation of more than one-eighth of an inch in many instances being sufficient to cause its rejection.

The coarser numbers of yarn, twisted, are used in the manufacture of duck. Where strength requirements are to be met, cotton of the best grade is used, but in some fabrics a certain amount of waste is used in the mixture. It is, of course, a two harness weave, the heavier fabrics being made on the medium or heavy type of plain looms; the lighter fabrics on either plain or automatic looms. It might be interesting to note just here that of recent years the automatic loom builders have been turning out looms capable of weaving heavier and heavier fabrics.

As no standard requirements can be laid down for duck, so neither can any standard constructions be given, as obviously, these will vary with the requirements and under different conditions. The following descriptions are, therefore, only very approximate averages.

Shoe duck is among the lighter and softer fabrics and ranges in weight from 6 to 9 ounces per yard, 37 inches wide. It is made of two-ply yarn, both warp and filling, counting from 49 to 52 ends per inch in warp, and 36 to 42 picks of filling. Single yarns range from 13s to 23s. This refers to the ordinary grades of shoe duck. The higher qualities sometimes being made of longer staple cotton and of the higher grades.

Army duck is a heavier fabric than shoe duck, and is

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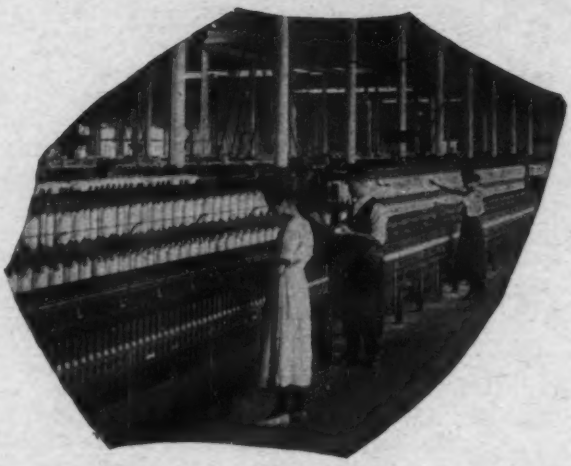

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After a thorough study of the situation our lubrication engineers recommended SLO-FLO No. 20, which permitted an increase in spindle speed of 420 revolutions, with all vibrations eliminated.

The above speed tests were taken after the lubricant had been in use six weeks and it was noted that there was no increase in power consumption, which of course indicated perfect lubrication.

Is *your* mill speeded up to top notch? Don't allow yourself to be held back from greater production because you think increased speed will cause oil yarn and oil stained goods. SLO-FLO positively does not "throw" at high speeds, nor does it run, crawl or drip under any conditions.

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made in heavier weights, from 6 to 15 ounces per yard, 28½ inches wide. The lighter weights are made of two-ply yarns both warp and filling, 50 to 56 ends per inch in warp, and 33 to 39 picks per inch of filling. Single yarns range from 12s to 23s. The heavier weights are made by using three and four ply yarns and reducing the number of ends and picks per inch, to the proper number in proportion.

Under the head of flat ducks would come both enameled and dress ducks, referred to in "A. M.'s" inquiry. What gives this class of goods its name is the peculiar manner in which the warp ends are drawn through the harness eyes; two ends being drawn through the same harness eye, giving the effect obtained when an end is left out on the ordinary plain weave, and known as a "flat." Hence the term, flat duck.

Flat duck warp yarn is sized and both single and double filling is used. The great number and variety of fabrics under this general name makes impractical the giving of any formulae that would indicate anything like standard or general practice. In weights, the flat ducks compare with the army ducks.

Numbered duck (also known as wide duck) is among the heavier fabrics, weighing from 18 ounces per yard, 22 inches wide, for No. 1 to 7 ounces for No. 12 The weight of each ascending number being an ounce lighter per yard than the preceding number. Thus, one yard of No. 1 duck weighs 18 ounces; one yard of No. 2 weighs 17 ounces; and one yard of No. 3 weighs 16 ounces.

There is frequently found considerable difference in the yarn numbers and number of warp and filling ends per inch in the formulae used for making the same numbers or weights of wide duck, but the standard plys used in making the different numbers are as follows: Nos. 1 and 2, 5x6; No. 3, 4x6; No. 4, 4x4; No. 5, 3x5; No. 6, 3x3; Nos. 7, 8 and 9, 3x4; No. 10, 3x3; No. 11, 3x2; No. 12, 2x2.

Some users, however, require special constructions that vary from these. The specifications of one large user of numbered duck call for numbers 7, 8 and 9 to be made out of four ply warp and three ply filling, just reversing the standard plys for these numbers.

Besides the kinds of duck given, hose and belting ducks are made in large quantities. The specifications of both are governed by the requirements of the buyers. Hose duck is a soft, open fabric, usually made in weights carrying from 12 to 30 ounces per yard, 40 inches wide, of yarn numbers from 6s to 14s, twisted into from 2 to 5 ply, and in special constructions even higher plys are sometimes used.

Belting duck is made under many different constructions, generally in weights of from 20 to 49 ounces per yard, 42 inches wide. Yarn numbers varying from 5s to 14s, twisted into from 4 to 10 ply yarns, as required.

It is impossible, in a short article, to more than roughly indicate the most generally manufactured fabrics and given even a faint idea of their differences. As before stated, the requirements are almost unlimited. I trust, however, that the information given herein will cover the ground required by "A. M." Contributor No. 21.

He who borrows from his neighbor never hears the last of it.

Taking Out Twist on Fine Speeders.

EDITOR COTTON:

I have read with interest the answers given by "Wash (Conn.)" to the questions submitted by "D. F. (Conn.)", under the heading "Further Details in a Mill Experience," in the January number of COTTON. I give you below the lay-out at our mill, and shall be glad to have you submit this to "Wash" and publish his comments thereon in an early number.

We run from 1 inch to 1 1/16 inch staple cotton, and are hung up as follows: The cotton is run through a hopper bale opener, distributed to an overhead lattice, and from that it goes to the different bins. We lay down a mixing of five bales of different marks at a time, so as to get as thorough a mixing as possible. The cotton is then placed in a self feeding hopper, passes through a Buckley opener, and is blown to the next floor, where it passes through an ordinary two bladed beater, and is made into breaker laps. It then passes through a two bladed beater, on the intermediate picker, with a doubling of 4, then through a three bladed Kirschner beater on the finisher picker, with another doubling of 4, giving a doubling of 16 in the picking room. We then pass the laps through the cards, with a result in the card sliver of 52 grains per yard. Our finisher picker laps weigh 42½ pounds—14 ounces per yard. We have three processes of drawing, with a doubling of 6 on each process. Our breaker, intermediate and finisher drawing all weigh 67 grains. Our hank roving on the slubber is .57 hk., our intermediate is 1.70 and our fine roving is 5.80. Our fine speeders are Woonsockets, 7x3½ and we run 1,300 revolutions on the spindles. Our front roll speed is 99 r. p. m. and we run a 19 twist gear.

What puzzels me in "Wash's" answer in the January number is the fact that he was enabled to run such a large twist gear. We have some 27,000 doubling through into the yarn, which in our case is 28s, but we have never been able to get along with as little twist as "Wash" was putting in, in the roving. We are beating the cotton some 50 strokes, but do not think we are injuring it in any particular way.

We have very good running work all the way through the mill, and as we run a filling wind very largely in our spinning room, we get a fair production, namely, 1.42 pounds per spindle in 55 hours, with a break of 67 to 70 pounds in the yarn. We should like very much to increase our fine roving production, for while we run various numbers of yarn and various hank roving, at times when we are all on 28s yarn, with 5.80 hank roving, we are pushed on our fine speeders. If we could take out 3 or 4 teeth of twist in the fine speeders, with the resulting increase in production of the fine speeder room, it would be of considerable advantage to us.

I trust I have made myself plain in the matter, and await with much interest "Wash's" comments on our lay-out. As we have been hung up this way for some 20 years, I shall be glad to know if we can improve on it.

Contributor No. 19.

EDITOR COTTON:

Following are my comments on the lay-out described by "Contributor No. 19" and submitted to me:

I think he would get better results if he mixed 50

Its Profits, not Price

When you are considering the installation of an

"UTSMAN"

Quill Cleaning Machine

The question is—how long can you afford to operate your mill without an "Utsman" and the economies that will result from its installation? The question should be reduced to a dollars-and-cents basis.

Proven Facts

Taken from the records of Textile Plants before and after installation of the "Utsman" shows that the economies resulting from the use of an "Utsman" Quill Cleaning Machine are so great that the purchase of an "Utsman" was a most profitable investment. The purchase price is soon forgotten in the light of subsequent economies and increased profits.

May We Mail You Proofs of Our Claims?

The Terrell Machine Co., Inc.

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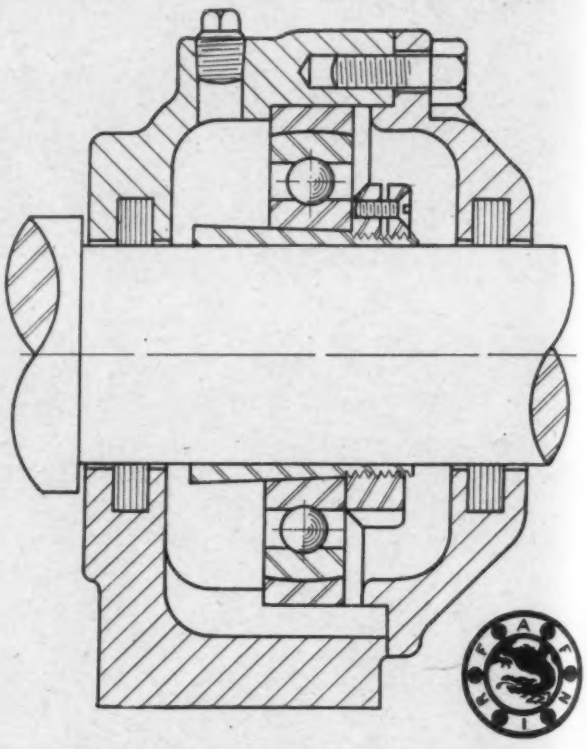

Kitson beater application of Fafnir Self-Aligning Adapter Ball Bearings.

How long is it since you have had a beater shaft wear so badly that you had to turn it down, add a bushing to bring the shaft to standard size again, and then re-babbitt the boxes? How long is it, too, since this destructive friction has caused a picker fire?

You can cut out this wasteful friction and protect yourself against repairs and possible fires by equipping your pickers with *Fafnir Self-Aligning Adapter Ball Bearings*,—and did you know that you can replace your plain bearing beater and fan boxes with *Fafnir Ball Bearing* equipment without making any alterations?

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bales at a time instead of five. His sheet of lap is too heavy; he should try a 13 ounce lap on the breaker picker, a 12 ounce lap on the intermediate picker and an 11 ounce lap on the finisher picker.

He is not beating the stock too much, however, I would speed the feed correspondingly to make up the production in the picker room. This would reduce the blows to the inch and would improve the work.

Foreign matter can be extracted more easily from a light sheet of lap. The Kirschner beater in the finisher picker should not run over 800 r. p. m. Set the feed plate on the card almost to touch the licker-in. The closer without contact the better.

His weight silver on the card is o k; but his drawing silver is too heavy. He should have a draft of about 6 on all his drawing, which would make his finished drawing sliver about 50 grains per yard. He should then speed up his front roll to make up production. If his drawing roll speed is too high, he should add more drawing frames to the hang-up.

He should be sure there is no draft between the front and calender rolls on all drawings. The web should be slack. This can be accomplished by changing the calender roll gear. I would make the slubber hank roving .75; this would reduce the frictional contact of the front leather roll.

He should be sure that all slides and lifting shafts are well cleaned and oiled. In fact every part driven by the bottom cone should be very free to revolve. This is very important. Let him lift any bobbin gear and turn it back to cause a certain amount of slack, and then start the frame. If the slack is taken up immediately, something is wrong.

He should also be sure that the rolls are properly spaced for the stock run. His carder should be a good sampler of cotton, for the least difference in the space between the first and second rolls will cause a certain amount of tension that will destroy the relationship of the surface speed of the front roll and bobbin.

His intermediate hank roving is all right. His yarn is breaking slightly above standard and I see no reason why a higher speed connot be attained on his fly frames. He certainly is running very good stock. However, I would like to have him try my suggestions, and I think if he will follow them that he will be able to take out twist on his fine speeders. Wash (Conn.)

Swan & Finch Company, 522 Fifth Avenue, New York City, announce the consummation of arrangements for carrying a large stock of "Slo-Flo" textile mill lubricants at Greenville, S. C., for the better accommodation of the trade in that state. They also state that W. A. Williams, of Greenville, who is well known throughout the state, will represent them in South Carolina and will have charge of the Greenville branch.

In the recent reorganization of the Greenville Belting Company, Greenville, S. C., A. B. Carter was elected president and treasurer of the company, and the following were named as directors: L. H. Shingle, Philadelphia; C. A. Rudd, Asheville, N. C.; M. E. Garrison, Easley, S. C., and W. J. Wiehe, Greenville, S. C. Mac Sanders, well known in the textile field, will continue with the organization as heretofore.

Setting the Warp Line and Drop Wire Box.

EDITOR COTTON:

Since the advent of the warp stop motion, it has been necessary to revise a lot of old-fashioned ideas in regard to the setting of the warp line, which consists of lining up the breast beam, harness and whip roll. The placing on the loom of the warp stop motion has now made it very essential that this motion, together with its accompanying drop wire, shall be taken into consideration when dealing with the question of setting the warp line.

Some of the old overseers of weaving and some of the younger ones are not getting very good results from looms with a warp stop motion attached simply because they do not take into consideration this very important addition to the loom, and therefore they do not study the method of setting this motion so as to get the best results from it. It is a very common occurrence for the drop wire box to be set in the same position for 2, 3, 4 and 5 harness work on cam looms, and I have also actually seen looms changed over from plain to fancy work, which required the addition of a dobby, and yet the setting of the drop wire box was allowed to remain the same when running 10 or 12 harness work as it was for 2 harness work, which, to say the least is sheer stupidity.

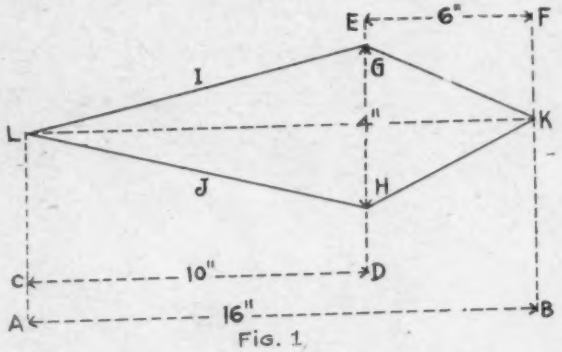

FIG. 1.

The best possible results can be obtained from a loom with a warp stop motion attached when the following rules are observed. First, the distance from the center of the harness to the fell of the cloth be the same, at all times, as the distance from the center of the harness to the front bar of the drop wire box, the reason for which will be plainly seen after a little study of the accompanying sketches which, to the experienced man, will explain themselves, but to which I will give a few words of explanation for the sake of the beginner.

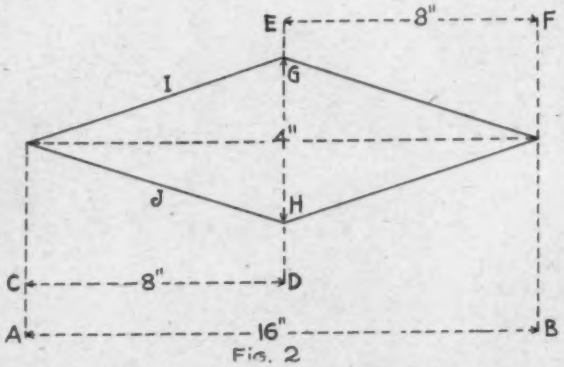

FIG. 2.

Figure 1 shows a condition which will be very often

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You are hearing of the "Better Bleach". That means that the trade wants a better bleach (without increase in cost.)

They want no more goods that turn yellow; that have lost a good part of their strength; that are harsh and hard instead of soft and elastic.

You know that you can satisfy this demand only with the peroxide bleach, which we will teach you.

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found duplicated even in some up-to-date mills, where the overseers, second hands and loom fixers are very good men in their line, only the line of thought here expressed has never occurred to them. Line AB represents the distance from the fell of the cloth to the front of the drop wire box which we shall assume to be 16 inches while line CD is the distance from the fell of the cloth to the center of the harness, and this we shall assume to be 10 inches. Looking at line EF, the distance from the center of the harness to the front of the drop wire box is here shown as 6 inches while line GH represents the movement of the center harness, or if an even number of harness are being used, then take the movement of the harness on either side of the center distance; this is shown to be 4 inches.

Now after a little study of Fig. 1 it will be very plainly seen that if the top shed I, and the lower shed J, are opened to a distance of 4 inches by the action of the harness at the line GH, then the strain on the warp yarn must be very much greater at K than at L, causing a great amount of warp breakage which could be very easily avoided.

In order to make this plainer to the reader, Fig. 2 has been prepared, and upon looking at the setting of the drop wire box as here shown, it will be plainly seen that if the distance from C to D is equal to the distance from E to F, then the strain on I and J must be equal, with the warp line set as shown in Figs. 1 and 2. The settings so far shown have only outlined the correct and incorrect methods of setting the drop wire box to the harness, but now the writer will endeavor to show the best method of setting the warp line. or the breast beam and whip roll which govern the warp line, so as to bear a correct relation to the drop wire box, or vice versa.

First of all, one vital constant factor must be always kept in mind and that is, what causes cover or face to be put on a piece of cloth, and right here is where a lot of doubt exists in a great many weaving overseers' minds, even among some of the older ones. It is common knowledge that when the whip roll is raised, it tends to produce cover on the face of the cloth by causing the upper shed to run slack, but the fact that the upper shed being slack allows the filling to come to the surface of the cloth and thus produce that soft smooth feel known as cover, is not

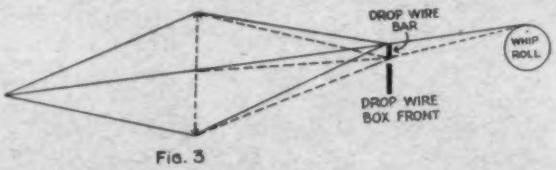

FIG. 3

so generally known. One other fact that does not seem to be so generally known is that the drop wire box can be so set as to spoil the warp line which may have been set so as to obtain a good cover on the cloth.

Figure 3 will give a good idea of what may be expected of a loom where the warp line is being spoiled by an incorrect setting of the drop wire box. The full black lines indicate the position the warp line should occupy, and the dotted lines show the position the warp line is compelled to occupy by reason of the drop wire box being set too low. This causes the slack yarn, which should cause cover to be produced on the cloth, to be taken up by the extra tension placed on the upper shed, due to the

setting illustrated and thereby prevents the cloth from receiving the cover which this setting of the warp line would otherwise impart to it.

One other bad feature about the setting of the drop wire box is shown in Fig. 4, and is one which is more often seen than the former one, although both are equally bad and produce results which are very detrimental to

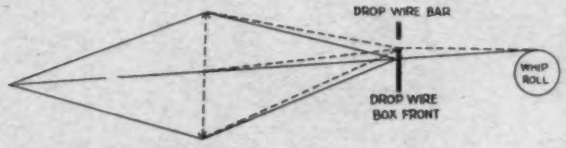

FIG. 4

the good running of the warp with an attendant loss of production, and making second quality cloth.

The full black lines show the position the warp line should occupy, and the dotted lines show the position it is compelled to occupy by reason of the drop wire box being set too high. This setting is productive of two unavoidable evils, the first being that the yarn is badly strained as it is bent over the edge of the drop wire box front, and the second being that due to the long length of yarn required to reach the bottom shed, the warp ends when

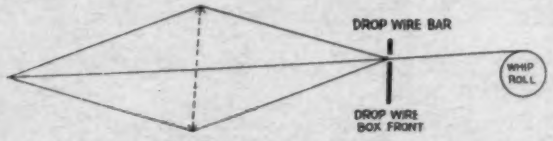

FIG. 5

raised are so slack that the drop wires quite often hang low, causing the loom to stop without a thread being broken, and, if this does not take place quite often the yarn hangs low in front of the harness thereby getting in the path of the rapidly moving shuttle and consequently being broken out.

Figure 5 shows a correct setting and one which will give good cover as well as causing the yarn not to be placed under any undue strain. Benjamin (Conn.)

Khaki Goods.

EDITOR COTTON:

Replying to the question of "Inquirer (N. J.)" in the October number, with reference to the manufacture of khaki from beginning to end that subject covers considerable territory. I once made khaki goods, that is I have made the cloth that was later converted into this kind of goods. It's all in the weave, after you get the right number of yarn to make it of. The yarn runs from 10s to 12½s for the warp, and from 12s to 15s for the filling. The weave is generally a twill, and the best any writer is going to give you is the number of the yarn and the weave.

The line-up through the card room for these numbers is as follows: about a 13-ounce lap, 55 grain sliver on the cards, 60 grain sliver on the finisher drawing frames, 160 grain slubber roving, 55 grain speeder roving with 12s warp yarn and about 14s filling yarn. It depends on the weight of goods desired. The buyer should send a sample of just what he desires to the mill and this sample should be unraveled and the picks figured, and also what numbers of yarn it contains in the weave; then the mill man should act accordingly, on his own constructions. The cloth is dyed the desired color after it is finished. With the numbers necessary to make this cloth, the looms can be adjusted accordingly, and the yarn sized to the atmospheric conditions in the particular locality.

If "Inquirer" wants me to go into details concerning just how the different things are done in the carding and spinning, slashing and weaving of this type of khaki, he can ask such questions as he wishes answered along this line. I cannot tell him what sizing compound to use, nor can I tell him what picks the goods should have. If he hasn't a sample he should get one and find this out for himself. T. A. D. (Ga.)

Some Knitting Questions Answered.

EDITOR COTTON:

Kindly answer the following questions for me through the Practical Discussion Department of COTTON.

(1) Does a narrow check needle make a finer stitch than an ordinary needle, and if so what is the advantage?

(2) What can be done to yarn that curls or twists the fabric after it is knitted?

(3) What is a practical number of yarn to use on a machine for splicing heels and toes on a 48 gauge, 200 needle, machine? W. H. E. (Ohio.)

EDITOR COTTON:

I will endeavor to answer the questions of "W .H. E. (Ohio)" as follows:

(1) A narrow check needle will permit you to make a tighter fabric, as the stitch is not stretched as much, as the needle passes through it.

(2) Yarn that twists the fabric has too much twist to start with. To overcome the trouble to a great extent, place the yarn in a suitable conditioning room so as to have moist steam turned on it until the entire package is penetrated.

(3) I have found that 40s combed peeler yarn is very satisfactory on a 200 needle, 48 gauge machine for heels and toes.

Bob (Iowa.)

Twist on the Fly Frame.

EDITOR COTTON:

Most mill men are surprised at the fact that it is impossible to obtain the figured twist on any fly frame. I have in hand a letter from a Rhode Island mill man who wishes to know why? I want to take this opportunity to state that I will answer personal inquiries only through the columns of this journal.

My answer to the question in hand follows: Any flyer that has a heavy presser rod and made to revolve at a high speed will hold the twist much more than a flyer having a light presser rod and running at a low speed. However, under any condition twist will escape at the termination of the presser finger on all fly frames. The only possible way to obtain the figured twist is to have the same grip on the drawing rolls. The more the pressure at the termination of the presser pad, the more you destroy the true relationship of the surface speed of the front roll and bobbin.

To order new flyers is easy, but to have them operate with cones modified for another type is not so easy. Re-

TAPE for spinning and twisting frames is a staple, and there's not much to say about it, but you can depend on it that

K-G SPINNING TAPE

is as good as can be bought—an honest product, the finest woven, the smoothest edges. The quality and stamina is there, and you have only to use it to be convinced of its superiority. Sample upon request.

Knit Goods Specialty Co., Chicopee Falls, Mass.

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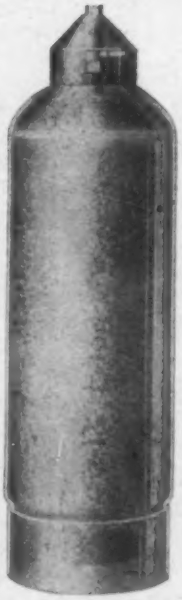

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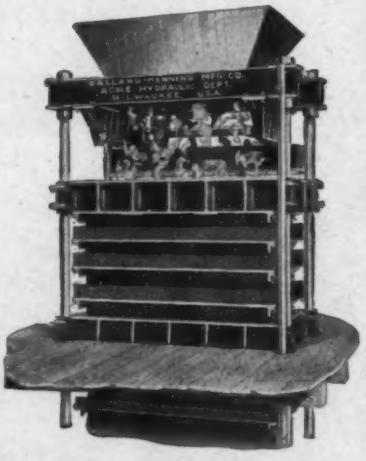

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Galland-Henning Mfg. Co.

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Southern Sales Representatives
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member this, that different types of flyers call for cones having different outlines to suit the intermediate speeds which is created by a different speed or by a presser rod which differs in weight.

This letter is for the Rhode Island manufacturer, and also for the elect in other mills.

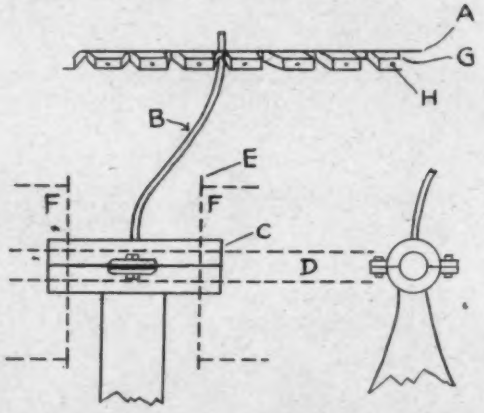
Before you decide to change your cones, flyers or speed on any fly frame, be careful. For speed, consult the builder's catalog. (Wash) Conn.

An Oiling Kink for Twisters.

EDITOR COTTON:

Although all moving parts of machines are supposed to be oiled and kept cool at all times, some get heated and give no end of trouble. I once had a twister in my department that was taken down twice on account of the cylinder bearings getting dry. It would take but a few minutes to get hot, at the same time the cylinder shafts were being worn little by little and in the course of a few days the cylinder would start wobbling, due to the cylinder shaft being out of true.

The oiler was instructed to oil these cylinder boxes four times a day but still there was always something the matter with them. The writer found fault with this particular make of frames the first time he saw them; the cylinders were so close together that every time a new box was put in, the cylinders had to be separated about 10 inches, sometimes this meant the taking out of one or two cylinders from the frame—an unpleasant piece of



work, let alone the loss of time and production. This kept the frame idle for several hours, but sometimes the repair shop was behind in supplying the spare boxes and this meant two or three days' stoppage.

When I took this position this was the condition that stared me in the face; the first week I had as many as five frames stopped for the reason given. I was puzzled with the situation, as these were new frames, having been in the mill only two years, and the second hand advised me that the oiler had kept them well oiled, so I started to look for the trouble, and I started that very same day as there was one of the frames idle for this reason, I took the boxes on all four cylinders and had an oil groove cut in each box, and inserted a long pipe between each cylinder ¼ of an inch in diameter. This pipe came up to the thread board at such an angle that the oil would run freely into the boxes as shown in the accompanying sketch.

In the sketch, A is the back of the thread guide. B is the pipe that carries the oil to the cylinder box C. D is the cylinder shaft between the cylinders. E is the flange on each cylinder to prevent the tapes from running off the cylinder. F is the cylinder. G is the thread-guides made of metal or wood. H the porcelain guides that are on the wooden thread guide boards.

This method overcame 90 per cent of the hot boxes, and we are getting good results. It is a simple method of getting oil to the cylinders, and is one that I know does the trick. T. A. B. (Mass.)

D. E. Trask Talks on Efficiency.

Recently the foremen and overseers of the Empire Cotton Mills, Ltd., Welland, Ontario, were the guests of the superintendent of the mills, J. G. Johnston, at a very pleasant dinner at the Niagara Inn, Niagara Falls, N. Y. Among those present and a prominent speaker of the occasion was D. Everett Trask, who for a number of years was connected with several mills in the South and who is well known and has many friends among southern mill men. He is now foreman of the carding department at the Empire Cotton Mills, Ltd. Mr. Trask spoke on the subject of "Efficiency," saying in part:

"We all know in these times of depression that generally the efficient man wins out. He may get a few scars, but he is still above water and taking advantage of every opportunity that is in sight to carry on and come out a winner.

"Regarding the word efficient, with your permission, let us delve into it and see some of the many phases it comprises. First, what do we think about ourselves? If we think we are weak, we tend to weaken both mind and body. If we think we are strong, we tend to strengthen every faculty and power in our possession. If we think we are incompetent we discourage and depress our faculties so they cannot do as good or as much work as they naturally have the power to do.

"In fact we can decrease our natural talent fully one-half by constantly suggesting to ourselves that we do not amount to much. If we think of ourselves as having the capacity of only doing so much, we put on a brake, so to speak, and our efficiency ends there. If we would attain higher efficiency, we must remove the brakes and give our talents and powers full freedom to speed on. The track is always clear, and the road bed in perfect condition.

"A second thought came to me in questioning myself: Am I showing the enthusiasm I ought in my work? The attitude of enthusiasm is of great value, because the more enthusiastic we are about our work, the more energy we apply to it, and the amount of energy applied governs our amount of achievement. How do I feel about my work? Our feelings about ourselves or about what we are doing will affect for good or ill every move we make, as there is nothing that gets more deeply into the real workings of mind, thought or talent than that of feeling. In fact our feelings, if detrimental, can upset everything in our mental make-up, or if favorable can in themselves increase force and effectiveness in any faculty a very large per cent.

"What is my mental attitude toward my work? The way our minds approach work will make a decided difference, both in the quantity and in the quality of that work. If our approach is half-hearted, indifferent or antagonistic,

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our best talent cannot possibly be expressed. Besides, we are most liable, while in such an attitude, to make many mistakes.

"On the other hand, if our approach is the best possible, we will make few mistakes, if any, and we will fully apply the best that is in us.

We should avoid such attitudes as fear, worry, discouragement, doubt, hesitancy, uncertainty, indifference and the like. If all these negative attitudes are avoided, our efficiency must necessarily increase to a very great degree.

"Am I up to the mark? To be up to the mark is an art rather delicate and complex and the highest use of our best faculties will have to be called into action before it is mastered. However, we can do our utmost to approach the lofty goal. Practical training is essential, but in addition to this, we must gain that something from within that has the power to insure all training with a new life, with rare quality, with superior worth.

We need something more than mechanical training to be really and truly efficient (or up to the mark), and this something more we get from the inside, from our interior nature, from the great depths within us, from the richer fields of mind and soul, and it is these fields wherein the heights of efficiency are attained. In fact, when we become as efficient as we have the inherent power to become, we will have reached a mark that is to us, in our present state, positively beyond comprehension. However, there is one thing we can do, we can strike out for that high mark now, and do everything in our power to move steadily and surely toward that great and wonderful goal, personal efficiency."

The Dodge Sales and Engineering Company of Mishawaka, Indiana, have issued a new catalog on Dodge standardization elevators and conveyors. It is one of the most comprehensive ever printed covering these subjects. The complete tables of data incorporated in the catalog representing an immense amount of work on the part of the publishers.

An interesting feature is the simple manner in which designs involving gearing are worked out, whereby almost any drive whether for a conveyor, elevator or other speed reduction can be picked out of tables; pitches, numbers of teeth and shaft sizes. All details are thus solved without any complicated calculations.

The catalog, which is standard Dodge size—6 by 9 inches—is printed on fine enamel stock paper, containing 160 pages and about 150 illustrations, has been in preparation for over a year and a half. It was prepared under the direction of A. O. Gates, M. E. of The Dodge Sales and Engineering Company.

The Kaumagraph Company, 209 West 38th St., New York City, has recently issued a book entitled "The Trade-Marking Manual." This gives complete information on the practical side of trade-marking and identification, and their relation to the safeguarding of "good-will," a commodity which can be established only through painstaking effort and expense, yet which, unless intelligently safeguarded, can be dissipated overnight. The book gives a thorough explanation of Kaumagraph dry transfers and their application in the various industries.

Walraven Company Makes New Connection.

The Walraven Company, 36-38 West Alabama St., Atlanta, Ga., have been appointed southern distributors for the Shambow Shuttle Company, of Woonsocket, R. I., and will carry a full line of Shambow products in stock at Atlanta for the southern trade. A. W. Angell, who has been connected with the Shambow Shuttle Company for a number of years, will be manager of the sales and service department to be maintained at Atlanta.

The Shambow Shuttle Company have been manufacturing shuttles since 1879 and have achieved an enviable reputation in their line of work. Recently they brought out a reinforced fiber shuttle which, in an exhibit at the Fourth Southern Textile Exposition under the direction of Mr. Angell, attracted a great deal of interest. It is claimed that this shuttle has a life twice that of a wood shuttle, and that it eliminates trouble caused by splintered shuttles. A specially prepared, hard vulcanized fiber is attached to the base in its manufacture, which gives wear resisting qualities and a uniformity which is retained under varying atmospheric conditions; the laminated construction strengthens the shuttle to prevent breakage. It makes for more production from the fact that there are no slivers, splinters or splitting edges to snip down one or more warp threads. At least an end down an hour per loom is prevented, it is stated, in the weaving of most fabrics. As fiber is much more impervious to oils than wood, the fiber shuttle will not absorb oils and greases. The company guarantees that the glue joint of this shuttle will not fail under normal running conditions and offers to replace any on which this occurs through defective workmanship.

Southern mill men are familiar with the Walraven Company, the progressive supply house which will represent the Shambow Shuttle Company in the South. They are southern representatives for some of the leading machine tool, mill and textile supply manufacturers. B. M. Grant is president; J. R. Walraven, vice-president; J. M. Fraser, secretary-treasurer; and J. C. Walraven, manager. The acquaintance and popularity of this well known Atlanta house, added to the quality products of the Shambow Shuttle Company, should make an effective combination.

Pontachrome Yellow G is a chrome yellow of a good green shade, recently brought out by E. I. du Pont de Nemours & Co., Inc. It is extensively used for wool in all stages of manufacture, being particularly suitable for use in all sorts of combinations such as browns, olives, greens and khakis. For this purpose it levels well and is highly satisfactory. It can be dyed either by the chrome bottom, chromate or after chrome process, although the best results are obtained by the after chrome method. Because it possesses good solubility it is used for machine dyeing. The fastness to light and milling are very good and the color stands stoving reasonably well.

The material is dyed as with an acid color for ¾-hour in a bath containing, for 100 pounds of material, 15 pounds Glauber's salt and 3 pounds acetic acid, 28 per cent. A further addition of 3 pounds acetic acid is made and boiling continued ¾-hour longer to exhaust the bath. Then there are added 1½ pounds of bichromate of soda after which the boiling is continued for another ½-hour, and finally the dyed material is thoroughly rinsed before drying.

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because of its pigment, flake silica-graphite, and vehicle, best linseed oil, has that quality of long life. It will not peel, crack or flake off because of the natural elasticity of the flake graphite.

Dixon's paint is made in FIRST QUALITY only and we have many records of long service in various industrial lines.

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Southern Distributors.

SHAMBOW
Woonsocket, R. I.

Notes About Men You Know.

C. M. YOUNG has become associated with the Georgia Webbing and Tape Co., Columbus, Ga., as sales manager and treasurer. He was formerly superintendent of the Columbus Power Company.

J. D. HUNTER, formerly connected with John Campbell Co., has succeeded R. F. Revson as southern manager of H. A. Metz & Co., Inc., with offices at 503 Trust Building, Charlotte, N. C. Mr. Revson has joined the staff of the Philadelphia office of the company.

R. F. DELLINGER, formerly overseer of carding, Cabarrus Mfg. Co., Kannapolis, N. C., has been made overseer of carding at the Lawrence Cotton Mills., Durham, N. C.

EVERETT H. HINCKLEY, consulting chemical engineer, of Boston, assumed, on January 3, the duties of technical executive with Borne, Scrysmer Company, 80 South St., New York City. Mr. Hinckley is a graduate of the Massachusetts Institute of Technology, and has devoted the the last 22 years to the textile industry. From 1909 to 1919 he had charge of the courses in chemistry and dyeing at the New Bedford Textile School, and under his charge these courses were brought to their present high state of development. The last two years Mr. Hinckley has maintained offices at 7 Water St., Boston, acting as consulting chemical engineer to the textile industry. The results of some of his work have appeared from time to time in the leading textile papers and have received attention both in this county and in England. With Borne, Scrymser Company Mr. Hinckley will direct the development, introduction and merchandising of their products to the cotton, wool, leather and general lubricating trades. In connection with this new work, Mr. Hinckley succeeds to the duties of J. E. Kimball, former superintendent of sales, whose death occurred on October 9, 1920.

ROBERT E. BRIGGS, New England manager of the yarn department of the Turner, Halsey Co., on January 1 became a partner in the firm of Harold W. O'Leary Co., 52 Chauncey St., Boston. Mr. Briggs is well known in New England, being for many years connected with the New England Cotton Yarn Co., and later with the Turner, Halsey Co. Alexander Hicks, also of Turner, Halsey Company, has become associated with the Harold W. O'Leary Co.

W. T. TAYLOR, assistant superintendent at the Riverside Mill, Anderson, S. C., died recently following an operation. Mr. Taylor was 32 years of age, and leaves a widow and two children.

KENNETH MOLLER has been elected a director of Lockwood, Greene & Co., Boston, Mass.

GEORGE E. TROWBRIDGE, for 25 years general manager of the Whitinsville Spinning Ring Co., Whitinsville, Mass., and a director of the Woonsocket Machine & Press Co., Woonsocket, R. I., died recently at his home in Linwood, Mass. Mr. Trowbridge was 64 years of age, and had been suffering for a short while from an attack of pneumonia.

F. E. TART has been promoted to overseer of the finishing department at the Kershaw (S. C.) Cotton Mills.

S. P. COOPER has succeeded in the position of the late J. D. Rose as secretary of the Harriet Cotton Mills and Henderson Cotton Mills, Henderson, N. C.

JOE DUNCAN has been appointed superintendent of the Acme Spinning Co., Belmont, N. C.

C. W. KALE has been named superintendent of the Sterling Spinning Co., Belmont, N. C.

R. D. MOSER has accepted the position of superintendent of the Southern Hosiery Mills, Burlington, N. C.

J. H. MCEWEN is now general manager and treasurer of the Charlotte Knitting Co., Charlotte, N. C.

C. L. GLASS has accepted the position of secretary of the Carol Mills, China Grove, N. C.

Southern Products Show.

It has been officially announced that the proposed Southern Products Show will be held in the Textile Hall, Greenville, S. C., next fall. The event will open October 6 and run through Wednesday, October 12, the building being closed on Sunday the 8th.

It is the purpose of the management of the Southern Textile Exposition, Inc., under whose auspices the show will be held, to have exhibits consisting of the products of cotton mills and of other industries in the South. Exhibitors at the Southern Textile Exposition are, in the main, manufacturers of machinery, appliances and supplies for textile mills, with only an occasional display of the product of a cotton mill.

The principal idea of the Southern Products Show will be to exploit goods made from cotton and its by-products. There will be a variety of cloths exhibited by cotton manufacturers. Converters, printers, garment manufacturers, collar and shirt manufacturers, etc., will be invited to show their products manufactured from cotton cloth. Manufacturers using cotton for making umbrellas, fans, bedding, sweaters, netting, curtains, embroidery, handkerchiefs, ribbons, gloves, overalls, slippers, shoes, hosiery, neckties, automobile tires, airplane wings—there seems to be almost an unlimited number—all will be extended invitations to be among the exhibitors at the show. Exhibitors are urged to include in their displays any small machines which are used in the manufacture of their finished products from cotton cloth and yarn, inasmuch as it is proposed to make the show an educational event as well as an agency for advertising the various products to be exhibited. No machinery used in the manufacture of the original cloth or yarn will be exhibited. Where machinery is shown, it will be a machine for developing either the yarn or the cloth into the finished article. This will include knitting machines, ribbon machines, machinery making collars, embroidering handkerchiefs and the like, whose exhibition will be urged.

An exposition of this character will be quite an innovation, something different, inasmuch as at no other show in the country are all the things made from cotton cloth shown. It will be the first of its kind—the first exposition for the express purpose of exhibiting cotton mill products. It is proposed to make the show a biennial institution, to be held alternately with the Southern Textile Exposition, which is also conducted every two years. It is hoped later to enlarge further upon the export feature of the show. The exhibition of such products as listed would undoubtedly interest many who are connected with foreign trade.

Probably the worst mistake a man can make is to correct the mistakes of his friends.

New Departure Company Wins Suit.

A very sweeping decision favorable to the patent rights of the New Departure Manufacturing Company in its double row ball bearing has been rendered by Judge Edwin L. Garvin in the United States Circuit Court, at New Haven, Conn.

The decree runs against the Rockwell-Drake Corporation, the Marlin-Rockwell Corporation and Albert F. Rockwell following a trial of several weeks duration.

The New Departure Manufacturing Company is granted an injunction against the defendants from further manufacturing, selling or using these double row bearings that infringe the New Departure patents. The court orders an accounting; and directs that the New Departure Company be paid all profits that have been made on the infringing bearing, that damages be collected and that the costs of the trial be paid by the defendant.

The question having arisen as to the liability of a buyer for merchandise delivered by seller to a railroad or steamship company under f. o. b. shipping terms and the refusal of the carrier to accept the merchandise because of existing embargo, the National Association of Hosiery and Underwear Manufacturers submitted a hypothetical case to Byron, Longbottom & Pape, attorneys for the Association, for a general opinion. This law firm says:

"If the seller tendered delivery to the railroad company, (which was the buyer's agent for purpose of transportation), and the railroad company refused to accept the goods for transportation on account of "an existing embargo," then it was the duty of the seller to take away and protect the goods by setting them apart and storing them in his warehouse or elsewhere as the property of the buyer, and it was also the duty of the seller, immediately or at least within a reasonable time, to notify the buyer of the railroad company's refusal to accept the goods for transportation, and that same were being held by the seller for the buyer; and if seller gave such notice and mailed invoice to the buyer then the seller would have fulfilled his contract and the buyer would be liable under such contract for the goods.

"The seller would also have fulfilled his contract had he delivered the goods to the railroad company at its freight depot and left them there, notifying the buyer to that effect.

"If, however, the seller took away the goods refused by the railroad company and stored them in his own warehouse but failed to give notice to the buyer of the railroad company's refusal to receive and transport the same, then the passage of title of the goods to the buyer and his liability to pay for same would be a question for determination, with the equities of the case in favor of the buyer."

The city of Spartanburg, South Carolina, is given a thorough exploitation in an attractive booklet which has recently been issued by the Chamber of Commerce of that place. It is profusely illustrated with views in and around the city, and contains convincing argument concerning the city as "the logical manufacturing, distributing and branch office center of the Carolinas."

The spring meeting of the National Association of Cotton Manufacturers will be held at the Copley Plaza Hotel, Boston, on April 27, 28 and 29. The meeting will open on Wednesday, April 27, with a program of entertainment for members and guests, preceded by a business session at which the president will deliver his semi-annual address, and the reports of standing committees, and of the secretary and treasurer will be submitted. There will be sessions on Thursday morning and afternoon and on Friday morning and afternoon. There will be a final business session at 4:30 o'clock Friday afternoon, and the meeting will close at 7:30 o clock with a banquet. James Thompson is chairman and Morgan Butler vice-chairman of the committee on arrangements.

"In Search of a Peaceful World" is the title of the latest book by Sir Charles W. Macara, Bart., a prominent figure in the textile industry of England for many years, who has been a leader in many public-spirited movements in connection with this and other matters of national importance. This book gives the practical views of a leader in industry, and contains the various articles, etc., which have been contributed by Sir Charles to the press of England and other countries since the last edition of his previous work, "Social and Industrial Reforms." It contains 318 pages which includes an appendix containing a biographical sketch of the author as well as an appreciation by him of the late Sir A. Herbert Dixon. The book is published by Sherrat & Hughes, Manchester, England.

The Newport Chemical Works, Inc., has discontinued its New York office. All business heretofore conducted at this office will be handled at the general offices at Passaic, N. J., it is announced. The officers of this company are: C. N. Turner, president; E. H. Kilheffer, vice-president in charge of sales; J. F. Blackie, vice-president in charge of operation; H. H. Springford, treasurer; and R. W. Wilson, secretary. Mr. Turner, the president, formerly located in Milwaukee, has moved his office to Passaic, N. J.

"Textile Mathematics—Part 1" is a new book which has just been published in England. The authors are T. Woodhouse, head of the weaving and designing department of the Dundee Technical College and School of Art, and Alexander Brand, chief draftsman, Douglas Fraser & Sons Co., Ltd. This book—the first of two parts on textile mathematics—has been prepared to fill a want in English textile literature for scientific textbooks relating to the textile industry. The recent passage of the Education Act in England has required that textbooks of an elementary nature appear, to give the students a study of the technology of the industry. Embodying all the general principles of mathematics, this book presents these principles in a manner which appeals to the textile student and all the examples and exercises bear directly on the problems of textile work. It is published by Blackie and Son, Ltd., London.

The J. H. Williams Company, Millbury, Mass., Arthur O. Buzzell, manager, are sending out, with their compliments, a useful souvenir in the form of a nice desk blotter pad, gotten up in a serviceable, durable manner, with leather corners and a supply of blotters.

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The Attention of Manufacturers Is Invited to Our New Model K

Producing a fabric without lines, using a latch needle, permitting speed of production, the making of heavy heels and toes and perfect plaiting.

Increased width of top and a greatly pronounced loose course for looping are features of great value.

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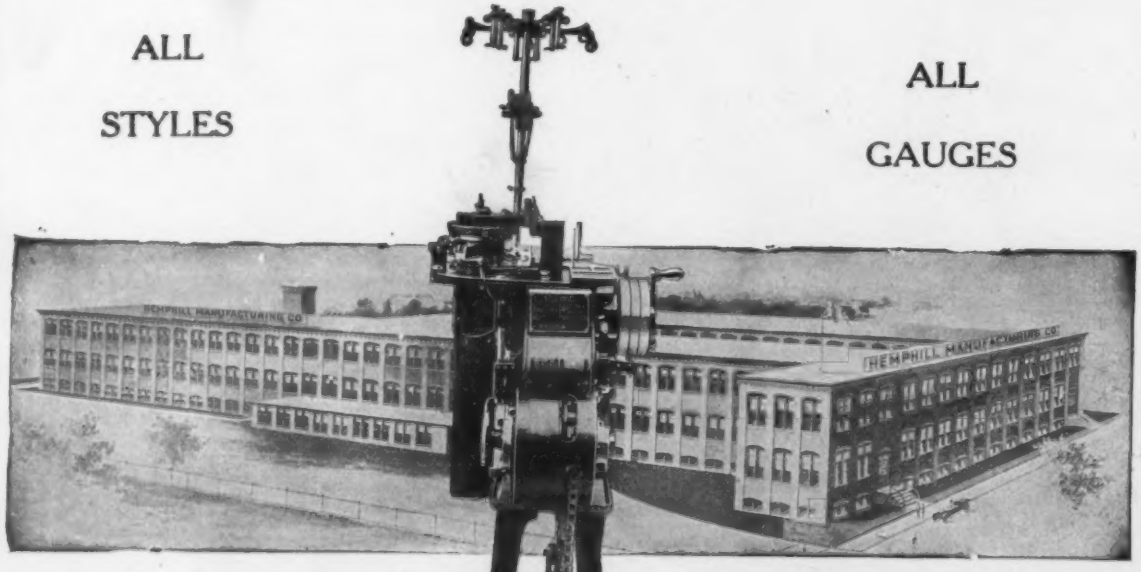

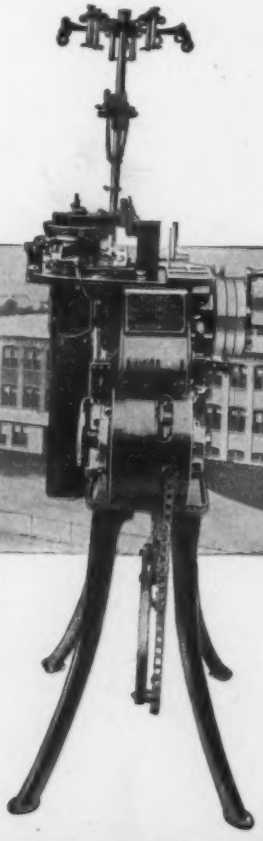

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Philadelphia, Pa.

Union Garments

BY WILLIAM DAVIS, M. A.

William Davis, M. A., the author of many interesting and instructive articles which have appeared in the Knitting Section of COTTON from time to time during the past nine and a half years, has recently obtained promotion in the knitting field, having been appointed Lecturer on the Technology of the Hosiery Trade at the University College, Nottingham, England, in connection with a big extension scheme to the University. Dr. Davis has since 1909 been principal of the Hawick Technical Institute at Hawick, Scotland, and well merits his recent appointment for which he is adequately capacitated through long experience.

In the underwear trade on both sides of the Atlantic there are at present occurring changes of ideas in regard to the staple articles of underwear. In America there is a decided vogue for the union or combination undergarment for men's wear, whilst in continental countries, the men's union suit is comparatively little known. Changes are possible in the near future for it is learned that the American market is absorbing an increasing number of ladies' imported combination or union garments, whilst recently a prominent manufacturer in Great Britain remarked on the growing popularity of the men's union garment in his trade. He stated that once the union suit became better known it would change the whole aspect of the underwear demand. For a long time back the vogue had been for separate garments, shirt and pant, and these were found to be uncomfortable owing to their overlapping at the join and causing discomfort, particularly when the wearer becomes heated. Separate garments, it is claimed, give greater freedom of choice to the wearer in how he may arrange his clothing, he can wear the shirt and discard the pants or the reverse just as it suits the character of his outer garments and the state of the weather.

In regard to the ladies' trade more than one knitting community owes its prosperity to the successful development of the trade in ladies' union undergarments and once this branch gets a hold on the public one can predict a steady growth thereafter. The garments are made in wool or better, cotton and wool, or silk and wool and it is not advisable to have them in a cheap material because of the considerable expense of making the garments, it is not worth while incurring this expense if the material is of such poor or unsuitable quality as will require renewal in a short period. The ladies' trade in pure cotton undergarments, union style, is therefore small and the pure wool goods are very expensive so that a compromise is to be found in the cotton and wool article. These yarns are made in light weight counts, for the garments are seldom found in gauges heavier than 20 gauge, whilst 30 gauge is by far the more popular. These cotton-and-wool undergarments are less expensive than the woolen varieties and have a further advantage over the pure wool articles in that they keep their shape after repeated washings which is a very important matter in their longevity.

Along with this point we have also that of reduced cost of finishing as compared with pure white woolen garments where the expenses of finishing, washing, bleaching and rendering unshrinkable amount to 25 or 30 per cent of the price of the yarn. The presence of the cotton blended with the wool considerably improves the whiteness of the fabric and renders any bleaching process unnecessary. Similarly the cotton reduces the felting action of the wool to a minimum, for the cotton fibers contrive to keep the wool strands more or less separate, so that the interlocking action of the wool scales is prevented.

Articles made from these yarns folded with silk threads are very much in demand for the higher class trade and these give great satisfaction to the wearers on account of their warmth and the elegance imparted by the silk element in the yarn. In some cases it is sought to have the silk placed on the face with a wool and cotton thread underneath to give added weight, as by this means it is claimed that the eye obtains the maximum effect from the presence of the silk and the whole lustre is evident. When the silk is in the form of a twist, it is in the nature of things that about half of it should be obscured from view in the yarn and nearer three-quarters of the silk being hidden on the back, so that of the whole lustre only about 25 per cent is effective as really reaching the eye of the observer. When the silk is plated with an underlying thread of cotton or cotton-and-wool most of the sheen comes to the surface, but this is judged too bright by many wearers who prefer to see the subdued lustre and the mottled brightness of the twist yarns.

Of course there are always a certain limited section of the trade in luxury goods who prefer to have the whole garment in pure silk or spun silk yarn and these goods are held in high repute for ladies' wear. They are correspondingly thinner, a total garment in some grades being easily compressible into a bulk of material which will pass through a finger ring but these articles are not so negligible as they would at first appear in regard to the essential of heat retention. Many who have tried these silken under-garments are content with no others even although the price is excessive. In conversation with one wearer the opinion was expressed that in his case, being an abnormally heavily perspiring individual, the silk proved more satisfactory than any other material as it did not so fully absorb the perspiration as the wool, but held it so that it was readily evaporated again by the heat of the body. That is, after being filled with perspiration to the stage of wetness, the silk was found to part with it again more readily in the form of evaporation, whereas in the case of other materials the moisture was held in the material for quite a long time.

Silk as a material is different from either wool or cotton in that a woolen garment is made up of millions of separate fibers of an average length of about two inches and there are a corresponding number of interspaces in the fabric. Similarly in the case of cotton, the material is made up of individual fibers of extremely short length

although compression into more compact form is possible. Organzine silk is an exudation from the body of the silk moth and lasts as long as the supply in the silk receptacles of the insect. It is in the nature of a fluid which becomes solid and tangible on reaching the air and it is related to gut or skin which presents a considerable barrier to the egress of heat from the body and it is admitted by those who have worn it that the heat preserving qualities of silk are superb and much in excess of what would be inferred from its weight or bulk. That is we obtain warmth without the corresponding disadvantage of the weight which usually accompanies it.

There is one point of advantage in regard to the use of silk, and that is the splendid results obtained from the dyes employed, for in this material color shows up with a brilliance which cannot be approached by any other fiber so that colors show with great effectiveness in the garment. However, when silk is used in conjunction with a woolen thread in the garment, it is usually the wool which is given the color and the silk is kept white, an arrangement which gives a certain charm to these color combinations. In some cases, in pre-war days, linen was introduced as a kind of substitute for silk in underwear, this yarn being employed along with a grey or fawn color of wool or cotton-and-wool ground thread, whilst the linen yarn was twisted in white. This gave a neat sparkling effect due to the lustre of the linen and produced a garment which was cooler in summer than the wool varieties.

Union Garment Construction for Ladies.

There are a number of special features which should be kept in mind in this branch of the underwear trade and success or failure may easily depend on whether these points are faithfully met. The outstanding requirement is to have the shape of the article correspond to the form of the body in every practicable manner and a most important point is the arrangement made for the accommodation of the busts, termed the pockets, of the union garment. In low grade goods these pockets are often inserted by seaming a piece of extra fabric at the parts, this being joined in a manner which cannot fail to induce discomfort to the wearer on account of the enlarged bulk of the material at a most sensitive point. In other cases of ladies' ribbed vests the rib stitch having such a large reserve of elasticity expands to the shape of the bosom and proves quite suitable in many cases where the parts are not too sensitive. In the case of others, the ribbed garments create serious discomfort due to the peculiar gripping action of the rib stitch in stretching and the parts are often chafed and irritated by the reverse lines of the loops which are raised and have the effect of marking the skin just as ribbed hosiery marks the leg, especially if there is any tendency to tightness of loop or coarseness of texture.

In some machines it is possible to set the needles for rib work at these points only, having the bulk of the garment plain, whilst in others the rib frame can be employed to insert ribbed busts which give every satisfaction in wear. As a general rule, however, it is advisable to make these delicate parts of the garment in plain stitch throughout as this has a much more even surface than the rib stitch can ever have. Further, more satisfactory results are obtained by fashioning the pocket exactly to shape, high in the center and gradually receding to the plain portion of the garment. For this purpose the makers of full fashioning rotary frames have been at special pains to make additions to its mechanism to produce a perfectly shaped pocket for the accommodation of the bosoms and, simple as this may appear, this device which fashions the pockets perfectly without seams or extra bulk at the join has been largely responsible for the great success of these garments amongst the feminine population. One may be able to make use of the reserve elasticity of the rib stitch for the purpose, but there is always a certain gripping action produced which increases with the extent to which the fabric is stretched, and the stretch and grip are highest at the apex of the pocket which is wrong in principle.

To Exhibit Fashion Features.

These garments have to keep pace with the leading fashion features of outer dress, particularly as it affects the height at which the neck portions are worn at the back and the front. If the outer dress is cut with a low neck, then the undergarment must be similarly shaped. As a general rule they are cut low at the front to be suitable for evening wear at fashionable functions, but of late this feature has been extended to the back as well, so that the articles have been low on each side with a kind of string over the shoulder to keep the garment in position. There is also the question of variation in sleeve length, in some seasons the fashion is to have the outer dress with short sleeves, a deficiency which generally goes hand in hand with the vogue for long gloves which reach up the arm nearly to the elbows. When the sleeves lengthen again, the length of the undergarment sleeve is also increased to suit.

This variation in style may seem to be troublesome, but it is in reality very good for trade, because very often before the old garment is worn out a new one is required to correspond with some fresh development in fashion and this keeps the trade active. As a further adjunct we have the ornamental lace patterned top for the article which imparts an aspect of distinctiveness and elegance, and gives features which are greatly prized by the wearers. Details of this trade and the formation of designs were dealt with in a former issue of COTTON. During the past season the butterfly device has been very prevalent, this being executed in the ordinary type of openwork lace pattern procurable by the Jacquard attachment to the "Cotton's" frame.

Working Details.

A number of details of working will now be offered with the aid of diagrams drawn to scale so that the form and also the proportion of the garment may be learned and by measurement to a certain scale, the dimensions may be calculated.

In making such a garment, the first care is to produce the body part, that is a piece of flat fabric of such a length that it will cover the front and extend down the back, a hole being afterwards formed to let the head pass through. This piece is given in detail and proportion in Figure 1, which shows the body piece with the sleeves attached. The material is run onto the machine at the width h h termed the haunch or lower body portion, this being of a greater width so as to allow for this part. Narrowings are at once commenced along the line h w equally on both sides when the fabric is continued at this reduced width to point b b which corresponds to the armpit. In the sketch this is shown to be uniform, but in practice it is found advisable in many cases to increase the

width somewhat at this point because, although it does not fit closely under the arm, the added fabric gives greater freedom of movement to the arms of the wearer and adds greater comfort at the bosom portion.

At this point b the fabric is divided in widths on the machine according to the dotted lines and the extra fabric portions are produced for the pockets. This bulging fabric is produced by a series of widenings which continue up to the apex of the pocket, when they again recede at the same speed of fashioning, so that the fabric again resumes its former width when the bosom portions are complete. The details of making these portions may be more fully referred to later, as it is a rather important part in the making of these garments.

The body piece is then continued as shown in the diagram from n to b1, b1 to w1 and hence through widenings from w1 to h1, the latter corresponding exactly to the

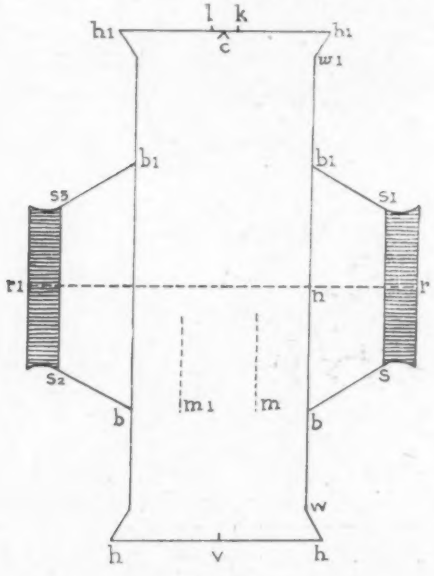


FIG. 1

narrowings h w on the front; on the back the fabric is worked plain at uniform width from n to w1 and the piece completed with the widenings as shown. The body piece can then be arranged for the addition of the sleeves, or this may be delayed till later on in the garment's progress.

To add the sleeve, the body portion is turned round sidewise and the part b b1 run onto the transfer points of the frame. For a 12-division frame, 12 such body parts would be treated by the frame worker on the same set of points which of course are of the identical gauge to that of the machine on which the garments are being worked. From the points of the transfer bar, a garment is transferred to each frame division in turn. The sleeves illustrated are of the short variety which is generally the case in the great majority of such garments as this gives a greater scope and freedom to their use with outer dresses. The width at b b1 is rapidly narrowed along the direction of the line b s and b1 s1 at which width s s1 the rib portion marked R is subsequently attached. For the addition of the second sleeve the body piece is now turned round to the lefthand side and an exactly similar width placed on the transfer bars, one piece on top of another after which they are transferred to the various divisions of the frame and the sleeves added in exactly the same way as on the right side. On the completion of the part to width s2 s3 the rib portion r1 is subsequently added, as for the other sleeve.

Working of the Leg Pieces.

The leg pieces are next attached to the body part in the manner illustrated in detail at Fig. 2 for one of the legs. The body portion in Fig. 1 is arranged v h on the front with v as the center point, whilst the corresponding center point of the back part is marked c. A little on the right of this will be noted a point k and a similar distance on the left the point l and these extra few inches over the center are employed to give the overlap at the back of the garment which is essential to give the garment strengthening where the legs join as they are subjected to an extra

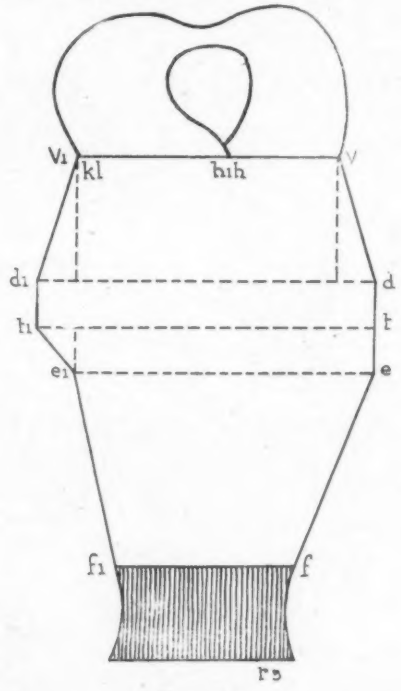
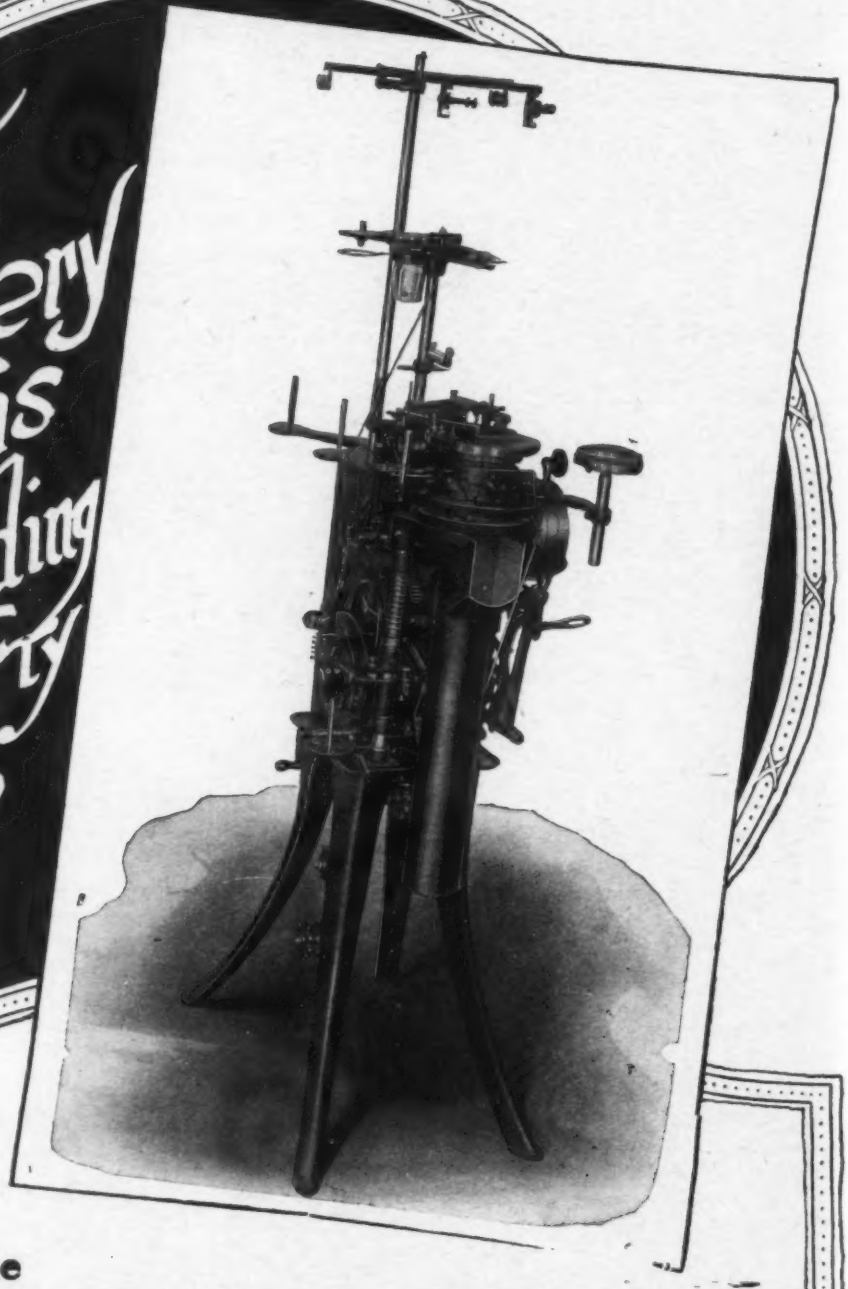


FIG. 2

amount of strain in wear at this part. Thus for the part illustrated in Fig. 2 the body is folded round so that the half of the front v is laid side by side with the back portion marked hl k, the distance from c to k being about three inches by which the center point is overlapped. When the second leg is run onto the needles, the part v h on the front is run on side by side with h1 l on the back, so that this gives a total overlap of about six inches at the back opening which considerably augments its wear-resisting properties. The process of making the leg proper can now be followed in Fig. 2 where the fashioning is as indicated by the lines on both sides, widenings are at once commenced, those on the right giving extra room for the abdominal enlargement v, d, t, e, and the extra fabric at the back being provided by the part marked v1, d1, t1, e1, the widenings from v to d are alike on each side and from d to t the width is kept uniform. When rapid narrowing is started from t1 to e1 on the left as this is the point on which the buttoning takes place for the back opening in the garment. From e to f on each side of the piece there is a rapid narrowing in the leg which brings the fabric down to just

The Hosiery Buyer is Demanding QUALITY



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under the knees with the addition of a long rib button indicated in vertical shading at r 3. For the second leg the procedure is identical except that the buttoning ledge d1, t1, e1 appears on the right-hand side and d e on the left, whilst the fabric run on to start with is v h h1 l reading from left to right.

Seaming and Joining Up.

The method of seaming and joining up this garment may be followed by reference to Fig. 3 which indicates the various pieces assembled complete in the finished article. The lettering has been maintained throughout so that the various sections of the garment may be easily followed.

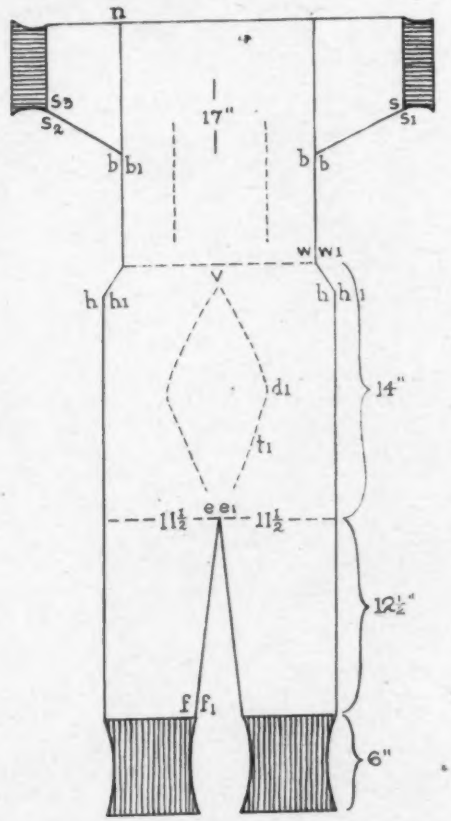

FIG. 3

The seaming of the arm on the left is noted to proceed along the underside of the sleeve, where the lower edge b s2 is attached to the upper edge b1 s3; similarly on the right the under edge b s is joined to the upper edge b1 s1, these seams being indicated in the finished figure 3. Similarly for the body, the part b1, w1, h1 on the back is attached to b w h on the front and likewise for the left side of the body. For the leg it should be explained that this is really also a part for the lower abdominal portion where fuller fabric is given as indicated by the extra fabric obtained at v d t e, this being seamed to a corresponding edge in the second leg, this giving a seam along the center of the body from the part v to e. There is no joining of the back parts v d t e, these being kept loose and provided with a button to secure the essential opening and closing. When v is reached the legs themselves are seamed individually along the inside, the edge f being joined to e1 f1 on the left with the rib part r3 seamed edge to edge along the inside. The process is repeated identically for the second leg portion, when the garment is assembled complete. The trimming proceeds in the usual way, a hole is cut for the head and the front is trimmed suitably and provided with buttons and ornamentation according to the style of the season.

Fashioning Particulars.

Some idea will now be given of the scheme of widening and narrowing adopted at the various points, for the whole success of making the garment depends on the intervals of shaping employed at the various stages of the garment. We will suppose that the garment is worked on a 24 gauge frame with 21 courses per inch, when a counts equivalent to 2/30s worsted size would be employed and would give a ladies' combination weighing about 8 lbs. per dozen pairs, or nearly 11 ozs. for the separate garment.

The sleeves would be narrowed 2 needles at each side after every 3 courses. The haunch portion h w would be widened about 3 by 1, that is widen one needle space every three courses on the back, whilst the corresponding narrowing on the front would be two stitches after every 6 courses, this would take about 12 leads, a lead being 2 needles. It should be added, that in this particular case the front w h in Fig 1 is started wide and has to be narrowed by 2 stitches at once after every 6 courses have been worked and when the corresponding increase of width is required for the other side we cannot widen 2 stitches at once as this would make large holes as imperfections in the cloth, so that the relation is maintained the same by widening one needle space after every third course has been worked. For the leg portion a very similar rate of narrowing will suffice, the usual in this gauge being one needle or stitch widened after every three courses. The narrowing from t1 to e1 is rather more rapid and takes place two stitches at once after every two courses. The narrowings for the leg e into f are 6 by 2, that is, 2 stitches narrowed after every 6 courses of work, this being continued the entire length of the leg.

Size and Proportions.

These are drawn out to scale in the various diagrams, but a few figures will be here given to indicate the general dimensions, on a standard women's size of this kind of garment. The narrow width of the body as from b to b is 16½ inches with a width of 19½ inches at the wide part h h giving 1½ inches of widening at each side. The full width of the sleeve portion at b b1 is 24 inches, whilst the length of the sleeve is 5½ inches to the rib top which, with its 3 to 4 inches of length, gives a total of about 9 inches. The waist or leg portion v v1, Fig. 2, lies 22½ inches in width, whilst the width at e e1 is 26 inches, all these dimensions being for the width worked on the frame. The leg finishes 14 inches wide at the rib top f f1, whilst the length of the rib part is about 6 inches. The corresponding lengths finished in the garment are indicated in Fig. 3 where the body from the neck to the start of the flap v is 17 inches, the flap including the lower part of the body is 14 inches whilst the legs are 12½ inches long with the rib top lying 6 inches long finished. The various finished widths are also given, the two-ply width of the bottom of the leg is 6 inches, across the body at the waist is 14 inches, whilst the legs are noted to lie 11½ inches wide each two ply. The portion b n for the sleeve is, of course, unseamed and open to allow of the insertion of the arms, and this lies 9½ inches double finished.

Contraction Allowances.

The garment designer should be able after some practice to produce the machine dimensions from any finished garment and vice versa, that is he should be able to estimate the widths and lengths at which garments will come up after the scouring and milling have been completed. Any garment when finished can easily be drawn to scale by simple processes of measurement and putting them down to some simple scale and when this has been done he should be able to estimate by calculation the lengths and widths required on the frame to give these finished dimensions.

For garments of the class just outlined the usual addition made to the finished length or width is one-fifth or one-sixth according to the nature of the material. We usually allow about one-tenth for contraction of a normal fabric when it leaves the needles of the frame, whilst a further allowance is for contraction in scouring and milling. In the case of cotton goods this contraction is negligible, so that the tenth will be sufficient allowance, but in the case of woolen garments, a further 10 per cent at least has to be allowed for in order to give widths and lengths which will allow the requisite contraction to take effect.

Knitters Meet at Charlotte

More nearly equitable prices for cotton yarns and cotton hosiery were forecast at a meeting of southern manufacturers in the Assembly Hall of the Chamber of Commerce, Charlotte, N. C., on January 12. Fifty mills representative of the cotton hosiery industry in a half dozen or more states responded to the call for the meeting, issued jointly by the Southwestern and Southeastern Divisions of the National Association of Hosiery and Underwear Manufacturers. The presiding officer was J. F. Taylor, Orion Knitting Mills, Kinston, N. C., president of the Southeastern Division.

From the standpoint of attendance and optimism the meeting was the most encouraging since industrial depression began to develop, more than nine months ago. Unusual enthusiasm was manifest, and the knitting manufacturers during their exchange of experiences and views as to the future were in a cheery mood. Many reported conservative buying by jobbers in almost every state, and retailers were shown to be placing small orders of a character indicating very low stocks generally. Orders in the main, according to the reports submitted to the meeting, were for immediate delivery, and much of the buying was for filling in and completing assortments, which appear to be badly broken in most wholesale and retail establishments.

In a get-together discussion, which consumed most of the forenoon, manufacturers showed a disposition to name prices based on replacement cost and wage reductions running from 25 to 40 per cent, and a desire to restrict sales to the first three months of the year. It was regarded dangerous to book business for deliveries beyond March, as it was deemed likely advances in yarns would be scored immediately jobbers began to operate on the low level of prices. In fact, an advance of two cents a pound on one count of coarse yarn was reported by one manufacturer as having taken place in a week.

Some of the indicated new low prices for the first quarter of the year are 90 to 95 cents a dozen for 176 needle full seamless cotton half hose; one dollar a dozen for women's looped toe cotton hosiery of the same gauge, weighing from 22 to 24 ounces to the dozen pairs; $1.85 for misses' fine gauge ribbed hosiery, and one dollar for misses' coarse gauge ribs.

Some of the manufacturers who participated in the price discussion declared they could not sell the hosiery at the figures indicated and get a new dollar for an old one, and vowed they would keep their mills closed until prices showing at least a slight profit might be obtained.

It was admitted generally the prices mentioned were too low to show a margin of profit, but it was thought that by going direct to the bottom stabilization would be brought about at once, whereas if prices were put at a level permitting recessions in competition, demoralization might be prolonged.

Warning was sounded that manufacturers had discounted cost and were in danger of being caught in a rising market, and it was the prevailing sentiment that it were wise to make no commitments beyond three months. Heretofore prices did not stick, it was pointed out, because buyers contended they were too high; now, it was the practically unanimous view, they cannot stick because they are, in a number of instances, under or dangerously near cost of production based on values as reflected in the distressed yarn market.

Making and marketing hosiery in the next few months, it was believed, will be a gamble, with the manufacturer taking all the hazard. If he deliver in a rising market at prices such as are being quoted he will be minus profit; should the market decline, for any unforseen reason, he will be a victim of cancellations.

Trade abuses, however, are to be safeguarded against through a system of reporting which was outlined to the meeting. Merchants reported to the knitters' organization for cancelling or returning merchandise last year have been listed, it was stated, these names of offenders being available to members of the organization on request for credit information. Slow-pay merchants and those who stubbornly ignore statements and dunning letters also have been listed it was announced.

The matter was brought to the attention of the meeting through reports that several jobbers of the smaller calibre who had repudiated their contracts were offering orders to mills other than those whose confidence had been abused. Such merchants probably will find it difficult to place their orders if manufacturers to whom they are offered avail themselves of the service of the credit information exchange of their national organization.

While a large number of jobbers have been clamoring for stability, some still are resorting to wilful misrepresentation in efforts for forcing unprofitable prices still lower. Several instances of this kind were reported from the floor of the meeting, the offenders being named. One large buyer stated in a letter to a southern mill that a given line of hosiery from the mill was being offered by the manufacturer at 85 cents a dozen. The buyer was ready to buy at such a price, but the mill addressed was unwilling

to quote less than one dollar. Documentary evidence was submitted to the meeting for proving that the stocking reputed to be on the market at 85 cents really was quoted at 97½ cents, regardless of size of the order. The disclosure was regarded sufficient to warrant the maintaining of an open price exchange for hosiery, similar to that of the New York State underwear manufacturers, and it seems likely that very shortly many manufacturers in each of several groups will have organized an exchange, to be conducted at the offices of the National Association in Philadelphia.

Taking up the heavy losses suffered by manufacturers in yarns bought at high prices and shrinking a full 100 per cent and more; the sacrifice of goods for converting merchandise into cash to avert bankruptcy; cancellations in greater volume than ever before had been resorted to by dealers, and sales at less than cost of production for the mere sake of preserving mill organization intact, a manufacturer said he doubted whether jobbers and retailers had gone as far in the deflation process as had the mills as a class. They shaded prices, of course, it was admitted, but it was asserted the margin of profit as between mill and consumer was unduly wide, considering the low prices at the source of production.

In defense of the jobbers, a manufacturer said there was no doubt in his mind they too had sustained enormous losses in striving to avert something more serious; that by far the large majority had made sacrifices no less than those forced on manufacturers. The retailer, it was said by this speaker, was the last to fall in line in the bringing of prices down to a level satisfactory to the buying masses.

C. S. Andrews contended for the retailers that they had pursued a wise course, in that they preserved their solvency by adhering to prices which spared them from losses. But for the solvency of the retailers, he went on, we manufacturers would be in even a worse plight, and "I believe," Mr. Andrews continued, "that had we walked in the path of the retailers we might have escaped much of the loss and confusion which have befallen us. The retailers continued to do business, at a profit; otherwise many of them might not have been able to liquidate their accounts."

"But," asked another manufacturer, "is it not a fact that, had the retailer reduced his prices commensurately as prices to him were reduced, he would have sold more merchandise and had equally large profits on his business as a whole, with the result more mill help would have been employed for meeting the greater demand?"

Reverting to the jobber, another manufacturer said: "The jobber is our best friend, and it comes with bad grace to antagonize him. We now are at a stage where, regardless of how much we lost, we must name prices based on replacement, and adhere to prices which will inspire the jobber with confidence. If, of course, we cannot operate our mills at a profit, the only thing to do would be to close them and not operate until a profit is in sight."

This seemed to supply the keynote of the meeting as relates to future business. Every manufacturer at the meeting was firm in the belief that the jobber was headed toward the market, but few looked for anything better than very conservative buying by the better element of the trade, with speculators flocking to mills ready to again fleece unsuspecting manufacturers the moment production overtakes demand.

Strong confidence in improved export conditions was manifest. A number of export houses which had been caught in the maelstrom of moratoriums and wavering exchange were reported as known to be adjusting affairs very rapidly, in anticipation of having their desks pretty well cleared within the next 30 to 60 days, when, it was felt, there would be a strong revival of shipments to foreign markets.

It was put fairly up to hosiery manufacturers to develop foreign markets to a far greater extent than ever was undertaken, for it was shown by statistics that with all the available machinery in operation full time production would be so far in excess of domestic consumption that, unless an outlet be provided, some of the smaller mills might be forced to go into other fields of endeavor.

So far as the immediate future is concerned, the outlook is the better for the fact, it was held, neither jobber nor retailer is stocked for longer than a few weeks. But, it was emphasized, there must be steadiness among manufacturers—no precipitate rush for meeting anticipated demand—they must not permit themselves to be carried away by a flood of small orders likely to pour in for spring.

The importance of shipping f. o. b. mill was stressed by several speakers, and a resolution was unanimously adopted to the effect that mills adhere to that form of shipping. Several manufacturers reported having declined to accept orders calling for shipment at the seller's risk, some of these orders afterward being returned to the mill with instructions, "Ship f. o. b. mill." Matters of this kind were cited for showing the need of courage on the part of manufacturers in dealing with buyers haggling for concessions in the way of terms.

A rising vote of thanks was extended to the Charlotte Chamber of Commerce for the use of the Chamber's Assembly Hall for the meeting.

Other resolutions endorsed the action of the National Association of Knit Goods Selling Agents in efforts to make contracts binding, and the proffer of the National Association of Hosiery and Underwear Manufacturers in placing at the disposal of manufacturers reports concerning merchants listed by the Association for cancellations of orders, returns of merchandise and delinquent in their accounts with mills.

R. L. P. Reifsneider, of the National Association, was elected secretary of the meeting.

L. W. Clark, general manager of the Carolina Cotton and Woolen Mills Co., Spray, N. C., was a recent visitor to the North Carolina Textile School, Raleigh, N. C., which is a department of the N. C. State College. Mr. Clark spoke to the senior class on the opportunities for young men with a technical education in the mill. The mills of which Mr. Clark is general manager are located in Spray and Draper, N. C. These mills are controlled by the Marshall Field Company, Chicago, as are other mills in Fieldale, Va., and Leaksville, N. C. David Lindsay, a graduate of the N. C. Textile School, is superintendent of the mill at Fieldale. Another graduate of this school is assistant manager at one of the Spray plants. There are 17 members of the senior class at the school this year, and this will be the largest class ever graduated from this textile school.

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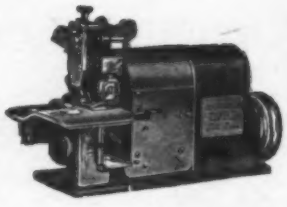

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The Knit Goods Market

January supplied the psychological moment for a change of front in the attitude of both buyer and seller toward knit goods. In the first half of the month there was a larger movement of goods than in the whole of December, and the second half started out to outdistance the first.

Last year's losses had been written off in the inventories, a volume of holiday business carried already shrunken stocks to the point of depletion, wage workers had accepted lower rates of pay for their service more nearly in keeping with declines in the prices of most commodities, yarns had touched their low point and manufacturers came out with a range of prices reflecting a sincerity of purpose in stabilization. The next move was made by the buyers, but it has been a cautious one.

Encouraged by even the ultra-conservatism of jobbers, manufacturers are showing a keener interest in yarns, and there has been buying in a small way for spot delivery, indicating that orders are coming to mills. With it all there has been a return of some of the idle to work, and mill conditions are somewhat better than for several months and appear to be headed toward more pronounced improvement.

Almost with the passing from the old year into the new there was manifest a desire on the part of many jobbers to acquire hosiery, and it may be stated as a fact that several mills of national repute among jobbers have booked firm orders each secular day since.

By mid-January small to medium jobbers were circularizing mills in quest of hosiery. Most of the letters intimated prices were low, and many manufacturers gave them scant attention. The inquiries were important only as showing that buyers no longer were waiting for sellers to offer merchandise; they were coming to market for it. Inquiries concerning jobbers who are making advances through correspondence have brought out, in fact, in a number of instances, that these jobbers constituted the chief class of offenders when cancellations were being offered as freely as their orders now are; when goods were arbitrarily rejected and contracts broken with a ruthlessness that left a blot on the morale of business.

Early in the January buying spurt The Berkshire Knitting Mills, Reading, Pa., named prices for its lines of ladies' full fashioned silk hosiery for Spring. During the first week salesmen were on the road orders were booked in satisfactory volume. The new price on standard 21 inch silk boot stocking, with mercerized top, heel and toe, is about five dollars above 1915. The stockings should sell at $1.50 a pair in retail stores. The mill's finer boot stocking and its all-silk are priced higher relatively, using pre-war figures as a basis, the latter at about $22.50 a dozen. The advances over 1914-15 are regarded as less than might have been expected, when it is taken into consideration the fact that the cost of machinery is double, wages still 70 per cent above, silk about twice as much and cotton yarn 50 per cent over pre-war. It is believed high grade silks are at the bottom; that a better tone in the raw silk market is equivalent to an intimation the mill will revise prices upward before selling up for the present season.

Not all of the hosiery orders that come to mills are accepted, being rejected, frequently, for either of a number of reasons—accounts of buyers who cancelled are not desired, or buyer asks for shipment at seller's risk, or wants prices guaranteed against declines; price offered by buyer not satisfactory, or buyer's delivery specifications cannot be complied with. The market still is in the buyers' favor, but sellers are less pliant than a month or two ago. Buyers and manufacturers have yet to compose their differences as to what constitutes an equitable price for mercerized hosiery for both men and women. Half hose and women's mercerized stockings are available at a variety of prices, ranging from $2.50 to $2.85 for 220 needle, ladies', the lower figure being named usually by holders in distress, it is believed. A line of women's standard 220 needle is priced $3.00 by several mills, whose quotation on 240 needle is $3.25.

Some jobbers are possessed of the foolish notion that a given type of stocking must be sold at the retail counter at a fixed or popular price, say 15 cents, 20, 25 and so on, and that the manufacturers must so price the stocking to the jobber that the latter can absorb about 20 per cent profit and leave the retailer good for 30 to 50 per cent on his investment. It is up to the mill to make a price or sell no goods.

Heather mix hosiery for men and women, some manufacturers affect to believe, will not be as popular this year as in 1920 if silk hosiery remain at or about present price levels. On the other hand, several mills report a strong call for heathers for distant delivery, and not a few mills are seriously thinking of substituting the line, in part, for mercerized and artificial silk.

While the cheaper numbers of cotton hosiery have been holding their own with silks and combed and fine gauge carded lines, prices are more nearly on a basis of stability since the January 12th meeting of southern manufacturers at Charlotte, N. C. While 90 to 95 cents was viewed by manufacturers taking part in the discussion as a starting value for full seamless 176 needle half hose, one pound per dozen, The Cannon Mills is quoting $1.05, and a Pennsylvania manufacturer $1.10. The southern knitters, therefore, are in little danger from recessions by competitors and should be able to do business shortly at a price slightly above that suggested in their meetings.

In the trade there is absolute sincerity in the view that the southern hosiery men were unnecessarily alarmed, and should have turned deaf ears to the 90 to 95 cent suggestion. They were nearer value in their indicated price of one dollar for women's looped toe 176 needle stockings, 22 to 24 ounces. The Cannon Mills' price is one dollar for sewed toe, so that, here again, prices which came out of the South are under those which since have been named in the North.

Taking hosiery as a whole, production facilities are held by some interests to be well ahead of maximum domestic consumption. It is pointed out that while last year there must have been a full 25 per cent curtailment of production, the equivalent of a loss of probably 25,000,000 dozen pairs, and exports aggregating about 12,000,000 there never has been a time in the last nine months when jobbers could not find all the hosiery they wanted, excepting,

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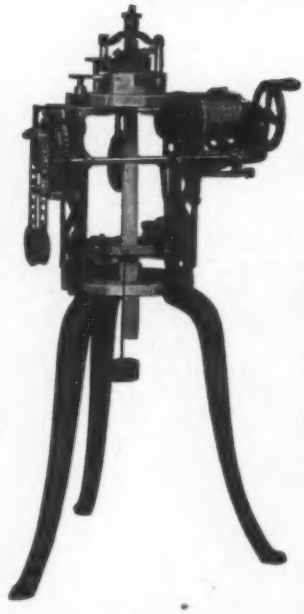

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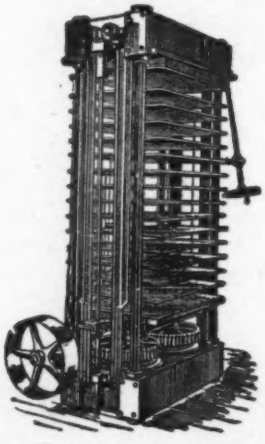

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of course, given sizes or colors for at once delivery, and this because mills refused to resume operation for filling small orders.

J. P. Voorhees, one of the better known selling agents in New York representing several important southern mills, does not subscribe to this view. He figures last year's output at about 70,000,000 dozens, and ventures the prediction that there will be no surplus for domestic consumption. He admits there promises to be no such scarcity as manufacturers were wont to predict during the rising tide, when labor was in short supply, indifferent and inefficient. He looks for no over-time production, such as was had for a time. Furthermore, some manufacturers have stated openly that they positively will not operate on the basis of present cost and price. Production, therefore, is to be again restricted, to be increased only as demand makes profitable prices possible. It is no exaggeration to say that, taken as a whole, prices at which the trade now can buy do not show a mill profit of the slightest moment.

The view is expressed by one authority that during the first quarter of the year not more than 20 per cent of the textile machinery will be operated; from 35 to 40 per cent during the second quarter; from 50 to 60 per cent in the third quarter and 60 to 75 per cent in the last quarter, an average of about 50 per cent for the year. At this rate there would be no dangerous accumulation of stocks.

Exports of cotton hosiery in November, 1920, showed only a slight falling off in contrast with October, totaling 693,039 dozen pairs. Notwithstanding the existence of a moriatorium in Cuba, that country took 184,557 dozens. The next heavy taker was Australia, with 104,365 dozens. Other countries to which more than 10,000 dozens were shipped were: Argentina, 44,102; Chile, 37,426; Colombia, 14,406; Peru, 18,655; Uruguay, 18,630; British India, 12,976; Philippine Islands, 19,343; British Africa, 13,408; Denmark, 11,091; France, 17,290; Netherlands, 17,453; England, 44,495; Canada, 17,187; Mexico, 13,523. The invoice value of cotton hosiery exports in November was $2,430,725, and for artificial silk, $456,051.

Exports for November bring the total for eleven months of 1920 to 10,933,157 dozens, almost a million and a half dozens more than for the whole of 1919.

Artificial silk hosiery exports during the month amounted to 55,116 dozens, and make the total for eleven months 748,506 dozens, in contrast with a million and a half dozens for 1919. Countries to which more than 2000 dozens were shipped were: England, 12,123 dozens; Cuba, 5709; Turkey in Europe, 2080; Argentina, 14,202; Uruguay, 2080; Australia, 7953.

New York City jobbers and commission houses in the last several weeks have had representatives tour nearby hosiery mills, notably in those village sections of Pennsylvania where cheap cotton hosiery is produced. Buyers were offering 75 cents for 144 needle. The price was 80, and, the moment inquiry became keen, was advanced to 85. One Pennsylvania mill making this gauge, in black and white and brown and white mixes, is holding for $1.10. The socks weigh 18 to 19 ounces per dozen.

Misses' mercerized ribs of finer than 300-needle have been sold at $3, and it is understood some buyers have paid even more. One selling establishment provides for a rise and fall of 10 cents. The rise should be not less than 12½.

A price announced for women's full mercerized rib top stockings is $4, moved up from $3.65.

Good 200-needle half hose, which have been on the market some weeks at $1.85 from a Pennsylvania mill, is being taken freely.

Hosiery bought on the present market should prove a profitable asset. This is asserted by manufacturers of the type whose judgment frequently is accepted by even large buyers. And it is a fact that buyers to whom some of the prices of today did not appeal a few months ago are accepting them as reflecting seller's sincerity. Psychology appears to be heading prices toward firmness as surely as it brought them down last year.

Yet some jobbers want price protection. One in this case admitted, "It is a good time to buy, if manufacturers will guarantee their prices against their own declines. Suppose prices went down and I had no guarantee, then I would lose?"

"That's right," said a sales manager for four important mills. "But we find it a good time to sell when the trade is ready to buy. If the yarns which we would buy to fill your order were to decline the mill would take a loss. We prefer to sell to men who are willing to buy on their own judgment. If you believe prices will decline, you should not buy. We operate that way in the yarn market. Sometimes we hit it right; sometimes we do not."

The jobber declined to take the risk. Few mills are extending the guarantee, a thing that is wrong in principle, vicious in tendency and not to be encouraged lest there be established a precedent from which manufacturers may find it difficult to depart.

Incidents during January which, it probably will be shown, had more than a passing influence on the knitted goods trade situation, developed at the meeting of the Jobbers' Association of Knit Goods Buyers, in New York, on the 17th. The jobber buyers' newly-elected president, Herbert L. Todd, of Adson, Moore & Company, Detroit, Michigan, in his address submitted the view that "the burden of necessity is on the manufacturer."

This is viewed as the beginning of buyer propaganda for longer dating, price protection—in fact, about anything jobbers might ask for. Their mistake lies in their extreme leniency in dealing with retailers, the mischievous effect of which they seek to pass along to manufacturers.

The jobbers in their annual meeting could not hide their interest in knitted goods, light weight underwear in particular. A careful study of much of what passed in the sessions leaves the impression that "the burden of necessity" is on the jobber—the necessity of acquiring merchandise.

It develops that there has been considerable buying of underwear for Spring, and some jobbers are known to have taken as many dozens as last year. Several lightweight mills have announced slight advances, and the situation is regarded such that if any did unwisely guarantee last month's prices, they will not be forced to permit rebates.

Several mills which had been idle have rejected orders for the reason they could not meet buyers' early delivery requirements. As there remain only thirteen weeks in which to complete deliveries to jobbers, it is apparent there may be very great pressure on mills a month or two hence, when Mr. Todd's vision of "the burden of ne-

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cessity" being on manufacturers probably will vanish, with a jolt to Mr. Todd.

Manufacturers will have only themselves to blame if a new crop of trade evils comes out of conditions as they now are. Their wavering in the past, detracting from, instead of contributing to, price steadiness was responsible for much of the clamor for price protection. Now they either must make prices stick, guarantee against declines, or have little early business and more late business than they can handle. The burden of necessity for guarantee against declines is on the jobber in want of lightweight underwear.

The heavy-weight underwear buying season for the winter of 1921-2, which normally should be in full swing now, probably will not open before the middle of March, and some manufacturers would prefer to not name prices until April. Nothing in the present winter underwear situation affords a basis of procedure for next winter.

A recent compilation shows that among sixty mills reporting, there was a loss last year of over 3,000,000 dozen garments, figuring on actual and normal output. But recently industrial statistics have not been valuable as an index of future demand or price, and not a prediction of the extreme optimists of 1918-19 has approached reality.

Sweaters, as in heavy-weight underwear, are a somewhat uncertain commodity, from the standpoint of actual value at the counter, because of climatic conditions. Because of cancellations there can be no heavy sweater stocks in the hands of either jobber or retailer, but the question with operatives is, how much stock remains in mill warehouses due to cancellations of orders and return of garments during the last quarter of 1920. The depressed condition of the worsted yarn market has had much to do with the shaping of the market situation as the season for buying sweaters for next winter opens. Yet there has been buying of samples at a rate indicating some jobbers contemplate going to the retail trade early for the winter of 1921-22.

Let Us Go Forward

BY T. H. JOHNSTON,

PRESIDENT, KNOXVILLE (TENN.) KNITTING MILLS CO.

The American people seem to delight to revel in excesses. They seem to rejoice in extremes. They quickly rise from the lowest depths and can ascend to the greatest heights, but sometimes they fall. In society this is called a mistake, often a disgrace. In commercial business, a failure. In the large circle of business, a panic. We are not going to have a panic and the worst is over, but let us consider what has brought about the present conditions.

During the period of the World War, the demand was so great for all commodities that prices advanced to a very high level. On account of this it is estimated that the increase in the cost of living based on various articles ranged from 100 to 146 per cent. On account of this advance in the cost of living and for reason of the demand for labor, wages were greatly advanced.

Both labor and capital seemed to lose sight of the fact that we were advancing on an artificial plane, seemed to accept these conditions as permanent, the manufacturer expanding his business as much as possible and labor indifferent as to work and saving comparatively little from the high prices paid.

Prices reached the high pinnacle last April and held well until July, when cotton was selling at about 42 cents and other farm products in proportion and many people were predicting that they would go higher.

The foreign exchange situation had been gradually growing worse and the buying power from other countries gradually diminishing by reason of this, thereby lessening our export demand. The Federal Reserve Board, feeling that business was overexpanding, began to cry deflation. The ratio of the Federal Reserve Banks, whose normal reserve is 40 per cent, dropped to about 36 per cent and they began to advance rates for call money and rates in eastern centers went as high as 15 per cent. The discount rates all over the country were gradually raised and their preachment became "Don't buy, but save." The result has been that we have tried to deflate in four months what it took four years to inflate and on account of the brakes being applied too quickly, the car has been skidding, or, as some one has expressed it, "While we went up a step at a time, we have been trying to come down the banisters."

This situation was greatly aggravated for the reason that politics were mixed up with business on account of our national elections which were held in November. Because of this, there was no concerted action for stabilizing anything at home or abroad.

The League of Nations, which should have been kept free from politics and which, when rightly interpreted, I believe would have had the greatest stabilizing influence throughout the world, became a target for politicians.

A referendum was invoked in the presidential election on this issue and during the heat of this campaign, for the reason that conditions were gradually becoming intolerable, the people became tired of the whole business and voted for a complete change, knowing little and caring less about the League of Nations issue.

The result of this whole situation is that business has become stagnant for the reason the buyers have been on a strike, money is tight, prices have been going down for lack of demand. Mills have been closing throughout the country so people have been gradually thrown out of employment and now we will start from the bottom and work up, and I feel the bottom has been reached on many commodities, particularly cotton and hosiery, which is being offered at less than the actual cost of production. Money is getting easier and it is time now to begin preaching "work and spend." Every dollar that is withheld from circulation and from buying actual needs is doing just that much to stop the wheels of progress and to keep people out of employment. It is not necessary to be wasteful but conservative buying will put life blood into business and will create confidence throughout the country in the stability of present prices and will have a wholesome effect everywhere.

The country is fundamentally sound in every respect. We own about one-third of the gold of the world; we are the greatest creditor nation in the world and our moral and financial responsibility is necessarily great. We produce 60 per cent of the cotton of the world; 75 per cent

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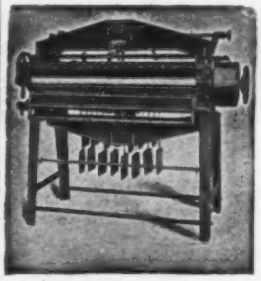

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of the corn; 27 per cent of the cattle; 40 per cent of the hogs; 25 per cent of dairy products; 40 per cent of the iron and steel; 52 per cent of the coal; 60 per cent of the copper; 66 per cent of the wool; and 85 per cent of the automobiles.

Our domestic commerce has increased 500 per cent in this country since 1900. Our foreign commerce has increased about 362 per cent and yet we are still trying to maintain a ratio of gold reserve in this country of 40 per cent, whereas England is ably supporting and financing her foreign export with a gold ratio of only 7 7/10 per cent.

I think our Federal Reserve banking system has aided greatly during this deflation period but I feel the pessimistic influence which they scattered and the quick deflation which they have tried to bring about by the contraction of credit has been very hurtful and I have never seen the cause for tight money in this country with the amount of gold that we have, especially when the Comptroller of Currency tells us, if necessary, the Federal Reserve Board could make use of $750,000,000 of unused credit and by a slight waive in their reserve rate, they could extend a credit of $2,500,000,000, or 25 times more than the banks have ever needed.

I think the experience we have passed through should cause an investigation and that we should gain helpful experience in further matters of finance.

By all means our excess profit tax should be reduced or repealed. This is one thing that is hindering investments and is tying up capital and preventing the free movement of commercial and business transactions. An early peace with Germany which could preserve our rights would have a stabilizing influence. The fixing of the German indemnity by European nations would also help greatly.

The South, while somewhat depressed on account of the low price of cotton, as compared with war prices, must take its medicine and profit by the experience. They should not become depressed but should realize that there is a great deal of money in the South besides the cotton crop, which only represents one-third of its products. We are rich in coal, iron, oil, sulphur, zinc, hydro-electric power and have more resources than any other part of the United States.

Let us lift up our heads and go forward, feeling assured that the future has in store for us much good. I feel that business will gradually re-act and on account of the great curtailment of the mills which has been forced during the past six months, our production will gradually be resumed before a great while and the demand will be restored to a normal basis.

The country is very short on homes—1,250,000 homes short—a great deal of building is needed, and labor must realize that they are holding this back and standing in their own light. The price of raw lumber has come down. The price on finished lumber has not been reduced as much as it should. Labor and building material, which make up a great part of the building cost, have not yet been reduced to a sufficiently low level. What the builders and the workers should do is to get together, appreciate conditions and realize they also must come down to meet the present conditions to enable this work to go forward. The delay in their doing this is simply working to the injury of all.

What we need in this country now is united interest and efforts to understand conditions and each and all help to turn the wheels of progress.

Let us go forward!

Among the Knitting Mills.

The Lansdale Knitting Co., Lansdale, Pa., has been incorporated with a capital of $30,000, to manufacture knit goods specialties, by E. A. Smith, Robert Workheiser and John Whitaker, North Wales.

The Grover Knitting Mills, Inc., Brooklyn, N. Y., has been incorporated with a capital of $20,000 to manufacture knit goods and kindred products, by C. Friend, S. G. Woldaver and J. Horowitz, 354 Tompkins Avenue.

Joseph B. Haber Co., Inc., Philadelphia, Pa., has been incorporated with capital of $100,000, to manufacture knit goods specialties, by Tekla Haber, George J. Scharr and Joseph B. Haber, Elkins Park.

The Perry Knitting Co., Perry, N. Y., has increased its capital from $100,000 to $700,000, for general expansion at its local mills.

The Apex Hosiery Co., Lawrence & Luzerne Streets, Philadelphia, Pa., is preparing plans for the erection of its proposed five-story, 92 x 110 feet, reinforced concrete addition to its local mill.

Williams & Aldridge, Inc., Rochester, N. Y., manufacturers of cotton fabrics, have been incorporated with a capital of $10,000, by H. V. Jones, Albert E. Aldridge and George B. Williams.

The American Mills Co., Waterbury, Conn., manufacturer of cotton goods, has filed notice of increase in capital from $1,200,000 to $1,500,000.

The Allied Knitting Company, 220 Fifth Avenue, New York, has filed notice of increase in capital from $40,000 to $60,000.

The Mallock Knitting Mills, Grand Rapids, Mich., has increased its capital from $50,000 to $100,000, for increased capacity.

The Hand Knit Hosiery Co., Sheboygan, Wis., manufacturer of cotton hosiery, is planning for the erection of a two and four-story addition to its present plant, for increased capacity. The proposed building will be 60 x 250 feet, estimated to cost about $100,000 with equipment.

The Swiss Knitting Co., Dover, N. J., has been incorporated with a capital of $300,000, to manufacture knit goods specialties, by E. D. and E. G. Kattermann, and Herman Kattermann, all of Dover.

The Bennet Elastic Web Co., Chicago, Ill., manufacturer of cotton webbing materials, has filed notice of increase in capital from $50,000 to $75,000.

The Unique Knitting Mills, Chicago, Ill., has been incorporated with a capital of $40,000, to manufacture hosiery, sweaters, and other knit goods specialties, by Leopold Kling and A. J. Plaum.

The Globe Mills, Leesport, Pa., have been incorporated with a capital of $60,000, to manufacture underwear, hosiery and cotton products, by Ralph G. Hill, Mt. Penn.; W. Morris Stewart and W. S. Wray, Reading, Pa.

The Ajax Knitting Mills, Inc., 156 Market Street, Newark, N. J., has been incorporated with a capital of $25,000, to manufacture knit goods specialties, by I. Madel, J. J. Smith and H. K. Cheatle, Newark.

The Peerless Knitting Mills, Boston, Mass., has established a branch plant at Barre, Vt., to manufacture knit

goods specialties. The company is planning for the installation of new machinery at the newly acquired mill.

The Wallace Wilson Hosiery Mills, Inc., with factories scattered throughout northeastern Pennsylvania, will open a new branch factory at Lansford, Pa., for the manufacture of goods for infants. The branch at Lansford will be in charge of C. L. Walters.

The Marquette Knitting Company, Marquette, Mich., is a new concern recently opened up for business.

The Hercules Knitting Co., Milwaukee, Wis., which recently announced plans for the construction of an addition to its plant to double its present capacity, has filed an amendment to its articles of incorporation by which the capital is increased from $25,000 to $50,000. The firm manufactures full fashioned hose, jackets and fancy knit wear. Hugo J. Kroetz is president and Bruno Kroetz is superintendent.

It is reported that F. T. Woodman, formerly sales manager for the Peerless Knitting Mills, Cambridge, Mass., has resigned his position and will engage in manufacturing nainsook underwear and pajamas.

An amendment has been made to the charter of the Durham (N. C.) Hosiery Mills whereby the concern is now incorporated with $10,000,000 capital stock. The new amendment provides 50,000 shares of preferred stock, at the par value of $100 each, and aggregating $5,000,000; 12,500 shares of common class A stock, at par value of $100 each, aggregating $1,250,000; 75,000 shares of class B stock, at a par value of $50 each, aggregating $3,750,000.

The Yarn Market.

While conditions in the New England yarn market cannot be called exactly rosy, the outlook continues to become brighter for the future and the belief that the worst of the long period of depression is over is gaining credence throughout the trade. Inquiries are more numerous and actual buying has increased on 16 to 30 singles for underwear. Shrewd observers describe this buying as speculative on the part of mills having ready cash, the better to enable them to produce finished goods at attractive levels when buying becomes normal. But at any rate it is encouraging. The activity is more pronounced in the Philadelphia and western markets than in New York or Boston.

Mills throughout the country are reopening, some admitting an absence of orders but hoping that a turn in the market will provide an outlet for their surplus now being manufactured. Fall River mills are operating more looms than heretofore although the increase is slight. The print cloth market shows greater strength than in some months and the trade in that city feel that normal business is closer than at any time in the past seven months. New Bedford mills are reported to be in the strongest financial position they have ever enjoyed despite the extreme dullness of the latter quarter of 1920. Returns to stockholders of New Bedford mills in 1920 were the highest ever distributed by the corporations. The average dividend disbursed was slightly more than 26 per cent, amounting to approximately $13,337,367 on a total capitalization of $50,966,500. This compares to the 1919 showing of $6,724,192 most favorably, with the average dividend for the past twelve years placed at 10.59 per cent.

Furthermore prices are beginning to stiffen for the first time in months. This applies to the coarser numbers of cotton yarn, as the demand is practically confined to that class of yarn today, in accordance with the public demand for lower prices. Fine counts are weak and prices continue to ease off, in contrast to conditions a year ago when the spinners could not turn out counts from 30s to 40s fast enough to satisfy impatient customers, regardless of price. Combed yarns have felt this influence most and they are hardly salable at any figure. For instance, 40s combed peelers have been sold as low as 60 and 70 cents while most spinners hold them around 72 and 75 cents. Early in January, 1919, this same number brought as much as $2.50 and $2.65. This affects the ribbon, hat band and webbing trades. Sea Island is much the same. Former users of these grades are now inquiring for carded yarns. In the latter grade, 10 singles eastern carded yarn now brings 30 and 32 cents against 80 cents in January, 1919. Tens, single combed peeler now bring 45 cents contrasted with $1.10 and $1.13 a year ago. Underwear and hosiery yarns, 40 singles, combed, that brought $2.00 a year ago are now begging at 70 and 75 cents.

Wage reductions are now general throughout the country, and have spread to worsted as well as cotton mills. Even Fall River, where manufacturers announced that no reductions would be made when the first signs of lower wages began to develop, has been obliged to succumb to the wave of wage slashing. There, like other textile centers, the operatives have accepted the 22½ per cent reduction "under protest." But even now the average worker receives 108.4 per cent more money than in 1915. The reduction in labor cost has been a factor of no small magnitude in restoring confidence and placing the industry on a firmer footing for a renewal of business.

Recent prices of representative numbers used in New England follow:

Southern Single Carded Cones.	
10s	26 @27
12s	26½ @27½
14s	27 @28
16s	27½ @29
18s	28 @29
20s	28½ @29½
22s	29 @30
24s	30 @31
30s	36 @37
40s	40 @45
Weaving Yarns—Warp Twist.	
10-2	27 @28
12-2	28 @29
14-2	28½ @29½
16-2	29 @30
20-2	30 @33
24-2	33 @35
30-2	33 @37
36-2	38 @40
40-2	40 @43
Northern Carded.	
10-1	31 @32
16-1	32 @33
20-1	33 @35
26-1	35 @37
30-1	38 @39
40-1	46 @48
Northern Combed.	
10-1	45 @46
16-1	48 @49
18-1	50 @51
20-1	51 @52
26-1	56 @57
30-1	63 @65
36-1	69 @70
40-1	72 @75

The advent of the New Year brought to the Philadelphia cotton yarn market little of the relief from a stagnant market, for which hope had been expressed by a number of factors during the latter days of 1920. In fact, the market went in the opposite direction to that forecast, about half the regular list suffering price reductions in the early period of the month. This applied without distinction to

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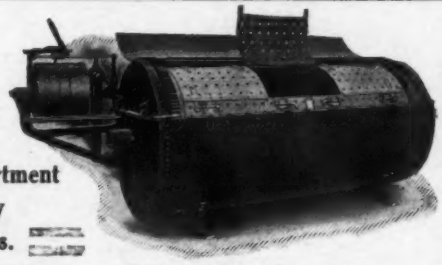

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Oxidizers are built with spur gear and also with worm gear drive. Also makers of Dye Machines, Oxidizers, Tom-Toms, and dye house machinery, to specifications.

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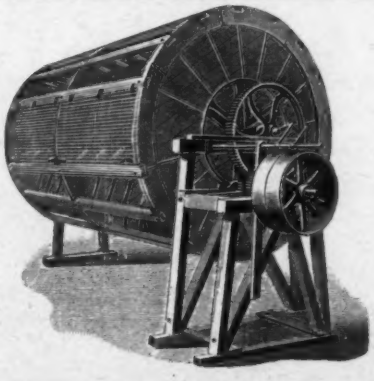

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They are just soft enough to mark the finest materials without injury and yet hard enough to wear well. 15 colors and white. Contain no oil or grease.

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LOWELL CRAYON CO., Lowell, Mass.

both carded and combed weaving yarns, of northern as well as southern spinning. Apparently, optimism in itself is not an adequate support, much less a lever, for prices.

As the month progressed, however, a most notable feature was an upward revision in the trend of the price list. In some counts it appeared that this advance was moderate and only temporary, but in southern carded yarns, it was a steady turn toward higher levels.

This stiffening in carded yarn rates was explained by some to be wholly due to the rise of three cents a pound in cotton which immediately preceded it. Others pointed out, however, that this was an indication that supplies of yarns in the mills of the Philadelphia district were even smaller than had been estimated. Perhaps an increased demand for materials from this class of yarn had something to do with it. And the statement was made that should yarns exhibit a tendency to rise still further, this would be reflected in the prices of combed yarns. However, for the time, combed yarns continued to drag.

In the first week of the month, southern frame spun carded cones underwent a reduction in price—a depression from which it later recovered, as has been indicated. Lower prices were reported for these yarns from 8s to 40s inclusive; 8s were bringing 24 cents; 14s, 25 cents; and 30s of this description were going for 31 cents a pound. In the second week, after the rally had begun, 8s were 26 cents, 14s were 27 cents and the price given on 30s was 33 cents. After the recovery was well on its way, in the third week, 8s were 28½ cents, 14s were 31 cents, and 30s had gone up to 36 cents on the same day.

These advances are given in but three numbers of the carded section, but they are representative numbers, and the general degree of their advance may be taken as indicative of the whole section.

Along about the middle of the month, there was little to indicate any justification of the prediction cast earlier in the month that with a healthy recovery in the carded department, the state of the combed section would be improved. That is, in some instances there was. In others a revival in combed yarns was noted. About this time the price situation became a more or less mixed proposition, but there was no longer any doubt about there having developed a stronger demand for yarns. Distributors were practically unanimous in reporting the receipt of fair-sized orders.

In the third week, carded knitting yarns were in relatively active request. There was a broader demand for them, and the prices were advanced further in consequence thereof. Demand for yarns for weaving purposes, however, was rather sluggish. This condition seemed strange, too, inasmuch as it is customary for the weavers to take the lead in periods of recovery.

Demand for knitting yarns continued strong as the fourth week, in which this is written, opened. Strong enough, in fact, to sustain higher rates than those in effect at the close of the previous week, which, in turn, were several cents a pound stronger than those prevalent at the close of the week before. This uprush was attributed partly to the volume of inquiries and orders which had accumulated over the week-end. 10s southern frame spun carded cones, at this time, were up to a basis very closely approaching 30 cents, while 18s had been pushed up a bit and were bringing 32 cents, with 20s slightly above this figure.

Was January business good? Let's take one week, the third. During this period, it was stated among a group of the larger yarn houses, this week's business was the largest handled in any similar period since December, 1919. It was pointed out that at the close of January, 1920, the general report was that that month had been the biggest in the history of the market, but this was explained away with the statement that most of the distributors favored with orders during the active week in question were very cautious about accepting much of the business offered in January last year, fearing that a break might develop and the yarns sold ahead might be difficult to deliver and collect for. December, 1919, therefore, was the last "big month" they had.

This would seem to indicate that the outlook, as viewed by these representative concerns, is more promising than it was a year ago; that the credit of the trade, in general, inspires greater confidence among yarn men today than it did at this time last year. However, it is learned that in some quarters the problem of to whom to sell and whom to turn down is just about as acute, at this writing, as heretofore, and a number of sellers are reported as saying they are willing to lose to their competitors some of the business being offered.

Business on the whole is looking up. Whether or not the remainder of the list will follow suit and join the ranks of higher prices in company with their carded brothers, would be a matter of conjecture on the part of this correspondent. It is interesting, however, to note the following paragraph in the weekly yarn report, issued near the close of January, of one of the leading firms of selling agents of the East:

"Our customers are strongly advised to cover their yarn requirements for the immediate future without delay, for we feel there is bound to be a material upturn in prices as soon as any considerable buying begins."

Recent Philadelphia quotations are appended:

Southern Single Skeins.

4s to 8s	26	10s	27
12s	26	14s	29
16s	29½	20s	30@31
24s	33	26s	34
30s	36		

Southern Single Warps.

8s	27	10s	28
12s	29	14s	29½
16s	30	20s	32
26s	34	30s	35
40s	45		

Carded and Upholstery Yarns in Skeins.

8-3-4 slack	26
9-1-4 slack	26
8-3-4 tinged tubes	20
8-3-4 hard white warp twist	26
9-3-4 hard twist waste	19

Southern Two-Ply Skeins.

8s	27	10s	27½
12s	28	14s	28½
20s	30½	24s	33
26s	34	30s	35
40s	42		

Southern Two-Ply Warps.

8s	27	10s	28½
12s	29	14s	29½
16s	30	20s	31
24s	34	26s	34½
30s	35	40s	45

Southern Two-Ply Combed Peeler Skeins and Warps.

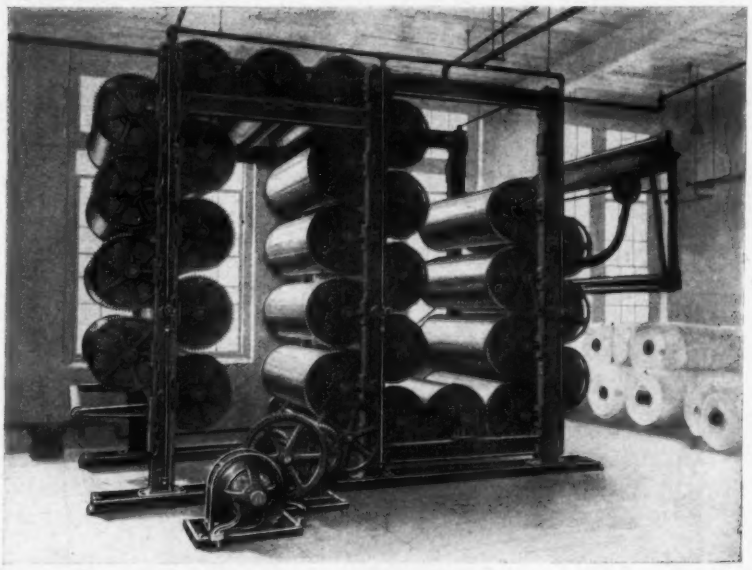
20s	46	24s	48
30s	50	40s	55
50s	60	60s	70
70s	80	80s	90

Southern Frame Spun Carded Yarn on Cones.

8s	28½	10s	29½
12s	30	14s	31
16s	31½	18s	32
20s	32½	22s	32½
24s	33	26s	34
30s	36	40s	45
30s tying-in			34@35
30s double carded			38

Northern Mule Spun Carded Yarn Cones.

10s	32	12s	33
14s	34	16s	35
18s	36	20s	37
24s	39	26s	40
30s	43	40s	48



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4th—Time required for loading and unloading machine reduced to a minimum.

5th—Absolutely level dyeings on all colors.

6th—Minimum of power required for operation.

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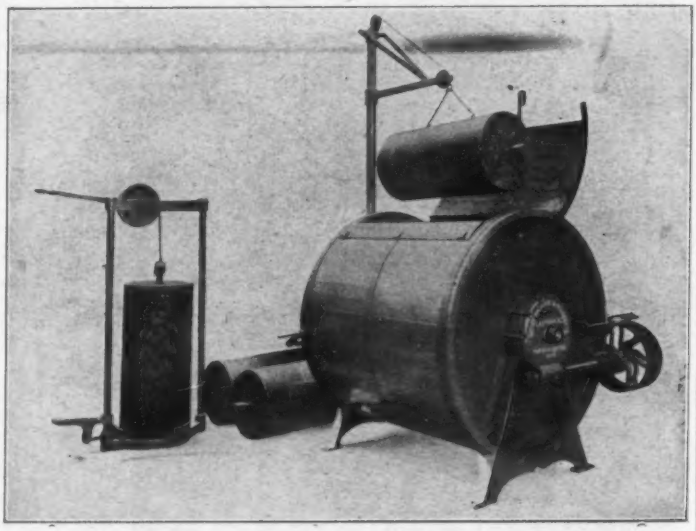

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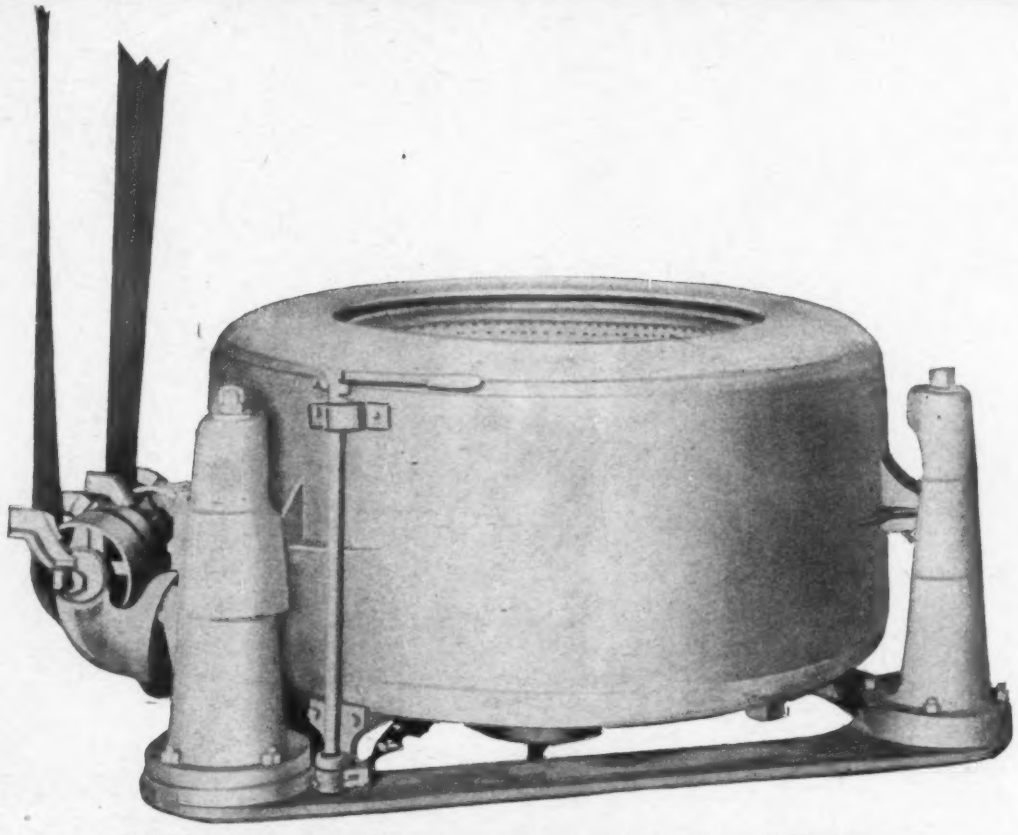

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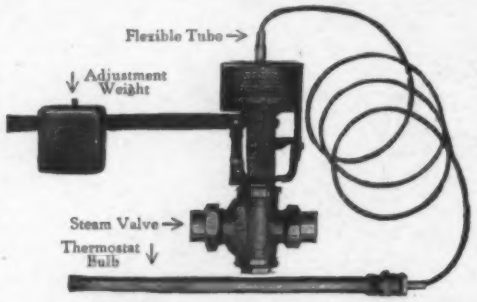

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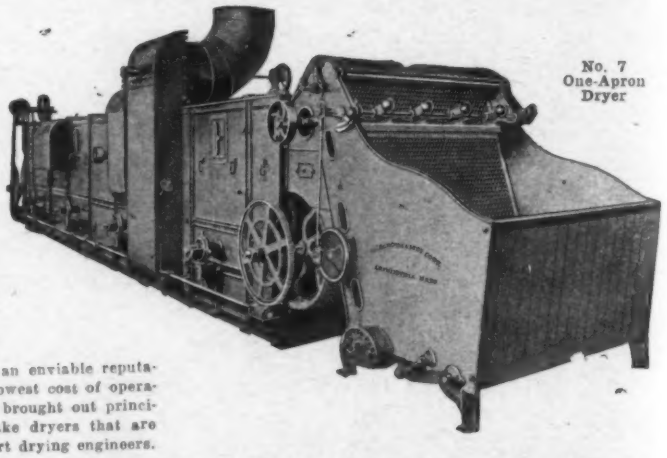

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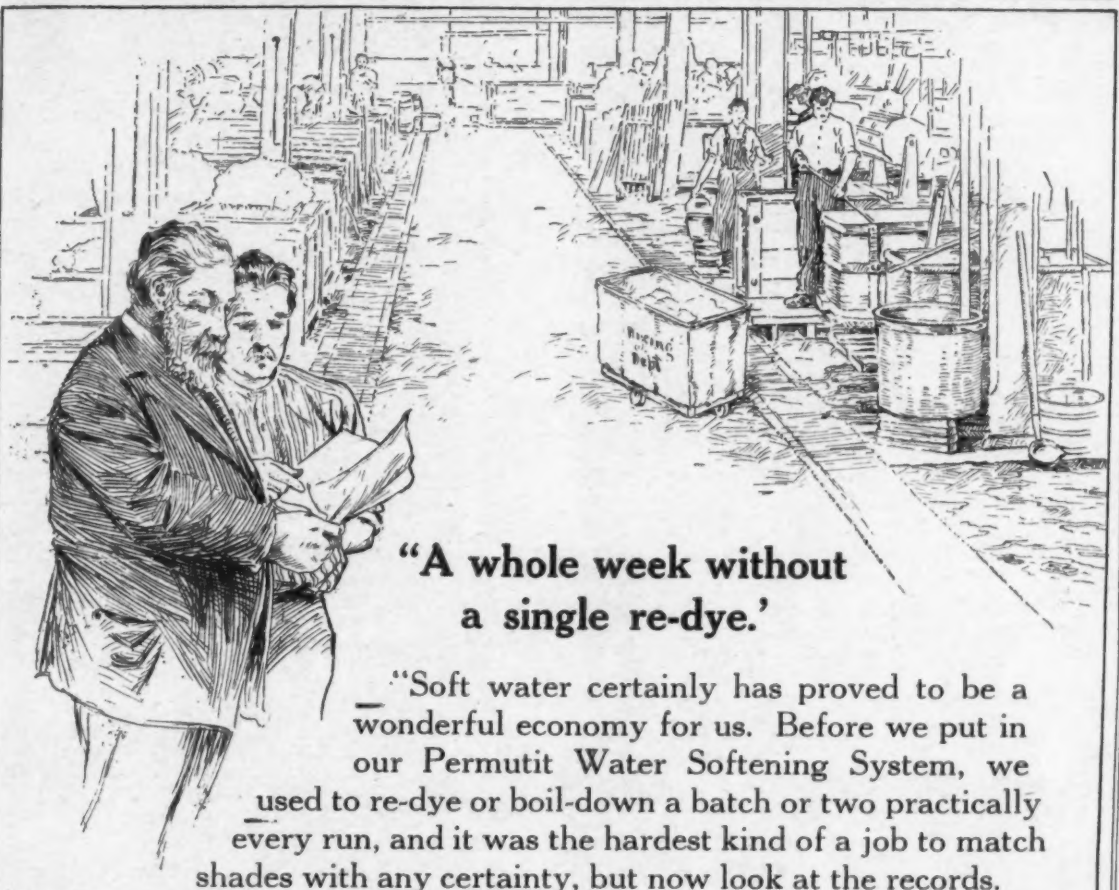

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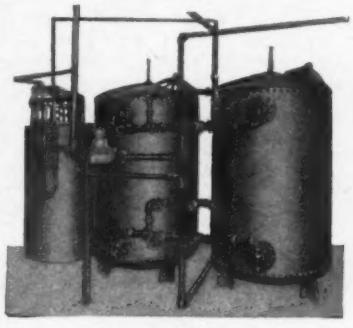
"Proctor" DRYERS



You Waste Money When You Use Hard Water

After analyzing the water you use, we can quickly show you the way to figure just how much money hard water is wasting for you.

It costs you money to do without the

BORROMITE
Water-Softening System

We will make a water analysis for you, free of charge. Our engineers will also tell you just *where* and *how* hard water is wasting your money.

Write for further details.

Borromite Company of America
Members of Associated Manufacturers of Water Purifying Equipment.
1516—105 West Monroe St. CHICAGO

ALTHOUSE CHEMICAL COMPANY

Office and Works:

500-540 Pear St., Reading, Pa.

Manufacturers of

DIRECT, UNION and CHROME
COLORS

ALTHOUSE CHEMICAL COMPANY

IMPROVE YOUR BLACK

"DEVELOPENE"

Turns a *Rusty Black* to a *Lustrous One.*

THERE is no slight of hand connected with it. Send a pair of stockings, a skein of yarn or a sample of fabric, which has been dyed black, washed but not finished, to our Laboratory.

We will finish it with "Developene" and return to you. There will be such an improvement you will immediately want "Developene" for finishing your goods.

MANUFACTURED ONLY BY

Kali Manufacturing Co.

MANUFACTURING CHEMISTS

1404-1410 N. Front Street **PHILADELPHIA, PA.** 1409-1413 N. Hope Street

Salicylic Acid Prevents Fermentation of Size

Sole Manufacturers of Hydroxy Oil and Kali Chlorine Neutralizer—the Superior Anti-Chlor. Formaldehyde.

FAST—permanent—not liable to fade, as a color. (Webster)

Fast Vat Dyes That Are Fast

——for Calico Printing
——for Cotton Dyeing
——for Silk Printing and Dyeing

are available for prompt shipment in

Blue, Red, Scarlet, Bordeaux Violet, Orange, Green, Olive and Yellow Shades

Laboratory Service

A. KLIPSTEIN & CO.

644 Greenwich St.

NEW YORK CITY

THE REPORT

of the Tariff Commission on the American Coal-Tar Dyestuff Industry, just issued, says:

"The domestic industry has been especially successful in the production of these colors for which there exists a large and constant demand. Sulphur Black....is consumed in the United States in larger amounts than any other color ....Some of the American brands are superior in quality to the best products imported from Germany before the war....

The production of this class is the most highly developed of all classes of colors."

The Atlantic Dyestuff Company is the chief American producer of Sulphur Black, and also makes large quantities of other Sulphur Colors.

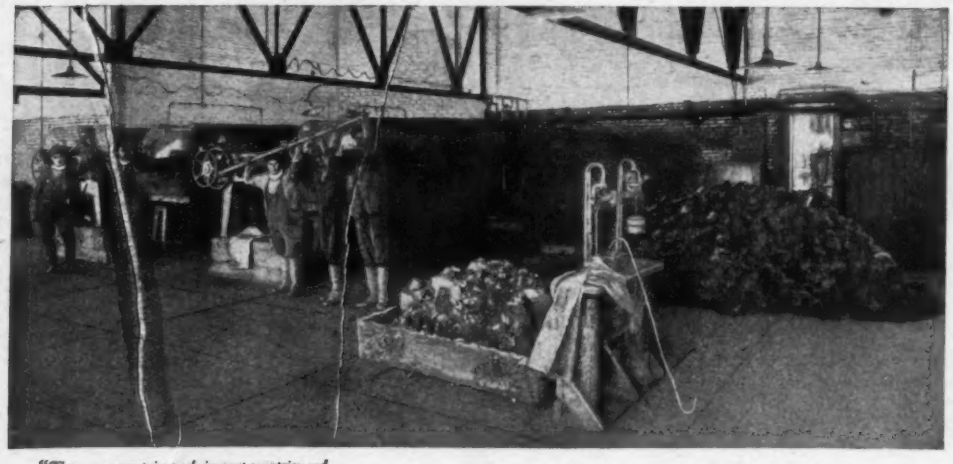
Atlantic Dyestuff Company

WORKS: PORTSMOUTH and BURRAGE

MAIN OFFICE, BOSTON

NEW YORK PHILADELPHIA CHARLOTTE

CHICAGO PROVIDENCE



"There are mountain peaks in most countries and in most histories; the mountain peak of the Du Pont Dyestuffs Works is The Indigo Plant."

INDIGO!—the first great proof of the intention and ability of the Du Pont Company to establish a permanent American Dyestuffs Industry—is now being produced by us in quantity sufficient to supply the needs of the entire country.

With manufacturing facilities second to none and with the finest chemical organization in the country, assurance is given by the Du Pont Company that America is self-supplying in the matter of dyestuffs.

E. I. du Pont de Nemours & Co., Inc.
***Sales Dept.*, Dyestuffs Division**
WILMINGTON, DEL.

DU PONT DYESTUFFS

VICTOR MILL STARCH

The Weaver's Friend

It boils thin—it penetrates the warps—increases breaking strength and carries the weight into the cloth. Being thoroughly washed free of gluten and other foreign matter it gives a bleach and finish to the goods that you can get from no other starch.

A trial order will convince you that VICTOR STARCH has no equal on the market.

THE KEEVER STARCH COMPANY, Columbus, Ohio

Southren Agent: MR. JAMES H. MAXWELL, Greenville, S. C.

If you are not already using VICTOR STARCH call on our representative for a demonstration at your convenience.

"BRETON" MINEROL "F"

For

Plushes and Velvets

"It gives a clothy hand."

BORNE, SCRYMSER CO.,

Established 1874

80 South Street, NEW YORK

BOSTON PHILADELPHIA

Works: Elizabethport, N. J.

ESTABLISHED 1815.

Arnold Hoffman & Co., Inc.,

PROVIDENCE, R. I. NEW YORK, N. Y.
BOSTON, MASS. PHILADELPHIA, PA.
CHARLOTTE, N. C.

Importers and Manufacturers of

STARCHES, GUMS, DEXTRINE, ALIZARINE ASSISTANT, SOLUBLE OIL, SOAP

And Every Known Material from Every Part of the World for Starching, Softening, Weighting and Finishing Yarn, Thread or any Fabric.

Special Attention Given by Practical Men to Specialties for

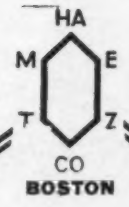
SIZING, SOFTENING, FINISHING AND WEIGHTING

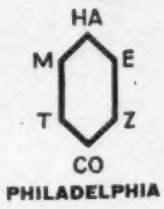
Cotton, Woolen and Worsted Fabrics combining the latest European and American Methods. We Believe There is No Problem in

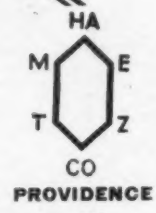
SIZING OR FINISHING

That We Cannot Solve.

FORMULAS for the best method of obtaining any DESIRED FINISH on any fabric cheerfully given.







Aside from the line of Dyestuffs, Intermediates, Cotton Finishes, Turkey Red Oils, Soluble Oils and Leather Oils made in the U. S. by

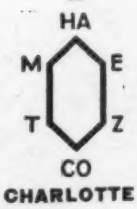
Consolidated Color & Chemical Co.

and

Central Dyestuff & Chemical Co.

ALGOL
HYDRON
HELINDON
THIO-INDIGO

vat colors will be procured for you on Import Licenses that may be granted you by the War Trade Board, or such of these colors as are available and made by the Farbwerke - Hoechst, Farbenfabriken vorm. Fried. Bayer & Co., Leverkusen, Leopold Casella & Co., Frankfurt, Kalle & Co., Bieberich, and Griesheim-Electron (Oehler) of Frankfurt. Licenses are granted for colors not made in the United States or not made in sufficient quantities or at reasonable prices. All products brought over on Licenses will be obtained by us at the lowest prices quoted for export to any one or any Government by the manufacturers.

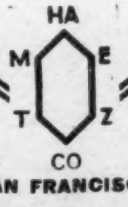


A new color card of American made colors on cotton yarn is being distributed. Have you received your copy?

H. A. METZ & CO. Inc.

One-Twenty-Two Hudson Street, New York City.

Boston Philadelphia Providence Chicago Charlotte San Francisco



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DYESTUFF DEPARTMENT"

Works at:

GRASSELLI, N. J. ALBANY, N. Y.

SULPHUR COLORS: Black, Blue, Brown, Green.
Direct Cotton Colors, Acid and Chrome Colors
MONOPOLE BRILLIANT OIL
Bichromate of Soda Sodium Sulphide
Zinc Dust, Chemicals and Acids

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The Grasselli Chemical Company, Limited

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For All Purposes

All Sizing and Finishing Products for Cotton

Bensapol
Bleaching Oil
Cream Softener
Glasgow Sizing
Levuline
Soluble Oils
White Finish

MONOPOLE OIL

Reg. Trade Mark No. 70991

SURPASS CHEMICAL CO. FOR USE IN AUTOGYP PROCESS OF DYEING. AUTOGYP PATENTED IN U.S.A. SEP. 25, 1917 IN CANADA OCT. 16, 1918 ALBANY, N.Y.

Why Waste Money on Bleaching?

Bleaching cotton goods is no longer necessary, and if you are continuing your old bleaching processes you are only wasting money.

Forget about the bleaching process. Use the AUTO-GYP Process of Dyeing which simultaneously dyes to shade and at the same time eliminates all specks, motes, leaf and shives.

The old methods took approximately 15 hours while the AUTO-GYP Process requires three hours' time and also preserves tensile strength, saves shrinkage, steam, labor, water and all chemicals used in bleaching processes.

Let us prove our claims to you at OUR expense. Write today for full information.

SURPASS CHEMICAL CO., Albany, N. Y.

AUTO GYP
Process of Dyeing

ZAVON

The Super Solvent

The manufacture of ZAVON, the well known textile solvent has been taken over by a new company and extensive factories have been put in operation at Danbury, Conn.

Here in the new factories ZAVON will be manufactured on an extensive scale to supply the textile industry with this superior solvent.

In the kier, the open kettle, or for all softening purposes, ZAVON is superior to soaps and soluble oils.

Send for working samples of **ZAVON** and learn the advantages of this effective solvent.

ZAVON COMPANY
Incorporated

60 Broadway
New York City

Mercerizing Gassing Bleaching

We have a new and strictly modern plant for mercerizing, gassing and bleaching.

Located as we are in the center of the combed yarn spinning industry of the South, we are enabled to furnish you with the highest quality processed yarns in all numbers.

The American Processing Company

Mount Holly, N. C.

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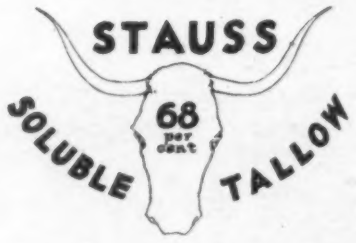
No. 346 Broadway,
New York City.

SELLING AGENTS,
THE RIDDLE COMPANY,
Mariner & Merchant Bldg.,
Philadelphia.



Stauss 68% Soluble Tallow and Gum—Soluble Oils

for all warp sizing and finishing purposes.
None better.
Manufactured by Geo. P. Stauss,

Importers and Distributors of
Starches, Softeners, Weighting Compounds

Write, phone or wire

Southern Distributing Company
Manuel Faulkner, Sales Mgr.
50 Market St., Phone 34[illegible]9 Charleston, S. C.

BOSSON & LANE

Manufacturers and Importers

Castor Oil and Castor Oil Products

Turkey Red Oil	Soluble Grease
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Castor Soap Oil	Soluble Rosin
Bleaching Oil	Olo Soffene
Monoline Oil	Snoflake Softener
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Flaxhorn—The Delicate Finish.

Works and Office: ATLANTIC, MASS.

Starch

EFFICIENCY and ECONOMY are the watchwords today. Modern mill men who hold to this motto are discarding ordinary, imperfectly refined starches and selecting those special types best suited for their individual conditions.

Some desire increased weight, all need increased strength and better weaving qualities for the warp.

You know the result you seek.

We know and can provide the proper type of Starch.

EAGLE FINISHING
C. P. SPECIAL FAMOUS N

BLEACHING and FINISHING PLANTS have learned that "any old" STARCH or DEXTRINE will not do the work. To secure the proper "feel" the desired weight, the attractive finish, careful discrimination must be exercised in selecting

STARCHES and DEXTRINES

We manufacture all approved varieties.

500 MILL 400 MILL
BLUE RIVER CRYSTAL
DEXTRINES and GUMS

Corn Products Refining Co.

New York

Southern Office *Greenville, S. C.*

Starch

Leatheroid
MILL RECEPTACLES

The Truly Permanent Fibre Cars

Leatheroid No. 3 All Fibre Car. Solidly Built. All wearing surface protected.

Leatheroid Cars, as all Leatheroid receptacles, are made of "Leatheroid"—the most durable and toughest, smooth fibre known, and the other parts are chosen with care, and put together right.

Leatheroid Cars stand the heaviest loads and roughest usage day after day, year after year, and then show very little effects of wear.

Leatheroid Cars, Roving Cans, Boxes, Baskets, etc., are made in all sizes and shapes.

Sold by Leading Southern Mill Supply Houses.

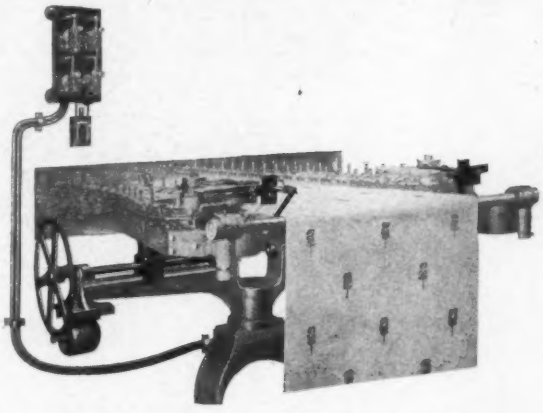
Rogers Fibre Company

Leatheroid Sales Division

1024 Filbert Street, Philadelphia

Leatheroid No. 2 Steel-Clad Car. Nothing Equals it for Construction, Finish and Serviceability.

THE SCHWARTZ AUTOMATIC ELECTRIC GUIDER



FOR
STRAIGHT AND
SWING TENTER
FRAMES

Handles cloth of any kind, weight or width

A LABOR SAVING
ATTACHMENT
OF PROVEN
EFFICIENCY

Specified and used in the largest mills in the country.

Manufactured and Distributed by

BLAKE ELECTRIC MFG. COMPANY,

1 ROWES WHARF, BOSTON, MASS.
Southern Representative: GREER & CO., GREENVILLE, S. C.

SPECIAL ANNOUNCEMENT

to the

SOUTHERN TEXTILE MILLS

Shambow Shuttle Company, Woonsocket, R. I.

Announce the appointment of **THE WALRAVEN CO., ATLANTA, GA.**, as their

SOUTHERN DISTRIBUTORS

with a complete service and advisory department in charge of Mr. A. W. Angell.

THE SHAMBOW LINE INCLUDES:

Fibre Reinforced Shuttles
Dogwood and Persimmon Shuttles
Cotton and Duck Reeds
Mill Necessities
Fibre Reinforced Picker Sticks
Spools, Bobbins and Skewers
Stock Bronze Bushings and Rods
Textilac Finish for Bobbins and Spools

This announcement should be of especial interest to every Textile Mill in the South as it means prompt deliveries with a service department in charge of a direct Factory Representative whose entire time will be at the disposal of the Mills, in helping reduce shuttle trouble to a minimum. LET HIM EXPLAIN TO YOU THE ADVANTAGES OF USING SHAMBOW FIBRE REINFORCED SHUTTLES.

THE WALRAVEN CO.
Southern Distributors
ATLANTA, GA.

SHAMBOW SHUTTLE COMPANY
Woonsocket, R. I.

Many errors in business and trade operation are avoided through the use of cost keeping Devices.
The Universal Recorder automatically keeps you informed.
Wise Superintendents—and the Production manager as well—look to the day when the mill will be working to its limit.
Each machine should produce to its capacity. Are yours doing their utmost. Are they running at a loss or Profit?

THE "UNIVERSAL" KEEPS YOU POSTED

Factory conditions and equipments are mighty factors in developing loyal workmen who will be alert to your production.

UNIVERSAL COUNTERS

Are inspiring to the operator
THEY WILL DO THE TRICK

We have some interesting information and will gladly send it to you—on receiving your request and address.
Our representative will call and give all required particulars if you will write to the factory.

Precision Machine Company
Manufacturers of Small Machine Parts
415 CHESTNUT ST. MILWAUKEE, WIS.
Southern States: Gordon Lewis, Walton Bldg., Atlanta, Ga.
Central States: Universal Sales Co., 301 M. & M. Bank Bldg., Milwaukee, Wis.

Experience proves that the roving cans that outlive all others and stand up under the severest strains, are the lightest and the most easily handled.

KEYSTONE "PEERLESS" SEAMLESS ROVING CANS

Send for our booklet showing full lines of Keystone Holloware for mills.

Orders filled through any responsible mill supply house or direct.

KEYSTONE FIBRE COMPANY
Box 242 Yorklyn, Delaware
Southern Representatives: Wilson Company, Greenville, S. C.
Philadelphia Office: 504 North American Street
Boston Office: 136 Federal Street

GREENVILLE

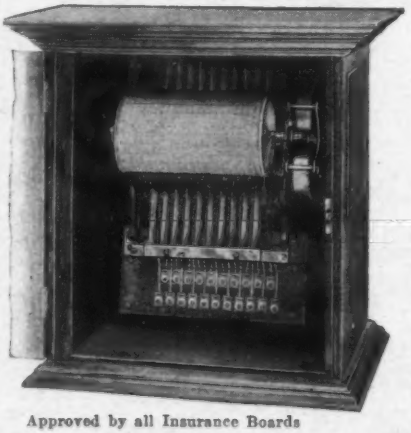
Spools That Satisfy

Let us submit prices and samples on WARPER and TWISTER SPOOLS. Plain wooden head and metal shield. A list of Southern mills using Greenville Spools given on request.

GREENVILLE SPOOL & MFG. COMPANY
Greenville, S. C.

SPOOLS

THE BOSTON MAGNETO RECORDER



THE LAST WORD IN WATCHMAN'S CLOCKS (STATION)

Approved by all Insurance Boards

This Tri-Record Clock furnishes a clear and separate registration for Saturday Night, Sunday and Sunday Night without changing the dial.

Estimate for complete installation cheerfully furnished on request.

WRITE FOR CATALOGUE

ECO CLOCK COMPANY
196 Congress Street, Boston, Mass.
24 Cortlandt Street, New York
23 Walton Bldg., Atlanta, Ga.

PERKINS GUARANTEED ROLLS

"Resistant but Resilient"

TRADE MARK

COTTON — PAPER — HUSK — COMBINATION

B. F. PERKINS & SON, Inc.

HOLYOKE, MASS.

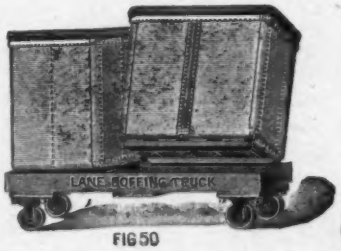


FIG 50

Lane Doffing Trucks are made to wear. Heavy Duck and Spring-steel frame permit rough handling. Light weight, easy running. Mounted on our improved Thread-guard Casters, either stationary or swivel.

LANE

Canvas Baskets and Trucks

A style for every department

Standard American Equipment

FIG 20.

Lane Canvas Mill Boxes are free from all roughness, thus reducing waste. Rim bound with tough leather. Shoes of hard maple, renewable.

W. T. LANE & BROTHER, Manufacturers Poughkeepsie, N. Y.

WHILE YOUR MILL IS MAKING SUBSTANTIAL PROFITS

is the time to equip with loom-harness whose service is measured from year to year instead of month to month.

"DUPLEX" FLAT STEEL HARNESS can show records of ten to fifteen years service at an average cost of ONLY 10c to 12½c PER SHADE PER YEAR with high cloth production and low percentage of seconds.

Let us quote you.

STEEL HEDDLE MFG. CO.

GREENVILLE PHILADELPHIA PROVIDENCE

Southern Office

111 Washington St. Greenville, S. C.

Hampton Smith, Southern Manager.

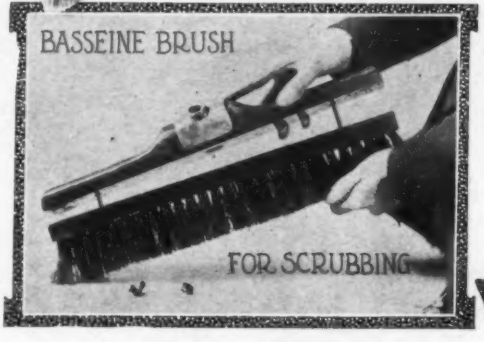
A Clean Mill To Work In

Means contented workmen, and contented workmen means better work and more of it. Coincident with the wave of receding wages that is sweeping over the land far-seeing employers are taking heed of the little things that go far toward making their employees contented and not the least of these is to keep the working place clean and inviting.

The "Two-in-One" Combination Sweep and Scrubbing Brush fits into the new requirements of the times because it is made to lessen toil and do effective work at the same time. Its use in any mill or workshop means absolute cleanliness, a big saving in labor cost, and minimum outlay in replacement. Write for catalogue and price list of brooms and brushes of all kinds.

SOUTHERN BRUSH AND BROOM COMPANY,

601 Citizens & Southern Bank Bldg., Atlanta, Ga.



S. S. & F. Co., Inc.

CHARLOTTE, N. C.

The S. stands for Southern, the S. & F. for Safety First

The only Flyer Presser Manufacturers in the South. Does your machinery need OVERHAULING? Does your Steel Rolls, Flyers, Spindles, etc., need REPAIRING? Are you NEEDING Flyers, Flyer PRESSERS, Rings of any kind, Guide Wires or any other supplies? If so, this is YOUR BUSINESS — OUR BUSINESS IS SUPPLYING these needs.

Southern Spindle & Flyer Co., Inc.

CHARLOTTE, N. C.

W. H. MONTY, · Pres. and Treas.
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AMERICAN SUPPLY COMPANY

PROVIDENCE, R. I.

MANUFACTURERS OF

Loom Harness,
Weaving Reeds,
Oak Tanned Leather
Belting, Strapping
Etc.

We make a specialty of Harness for Warp Drawing Machines

NOTE—No orders too large for our capacity. None too small to receive careful attention.

10 or 12 x 36

100% Service

The mill equipped with Diamond F Seamless Roving Cans is certain of getting maximum service.

The interior of these baskets is smooth and flawless. The steel bottom prevents any tendency of the can to sway or wobble. They are made of Diamond Fibre, the cleanest, strongest, toughest fibre made. That's why they are practically indestructible and give 100% service.

Write for literature.

Diamond·F

Dept. 8

Diamond State Fibre Company

Bridgeport (near Philadelphia), Penna.
Branch Factory and Warehouse, Chicago.
Offices in Principal Cities.
In Canada: Diamond State Fibre Co. of Canada, Ltd., Toronto.

Out in the Office And Back in the Mill

OUT in the office they're figuring payrolls, invoices, chain discounts, interests, costs, etc. Back in the mill they're calculating warpage, taking inventories, figuring fillage, etc.

It's costing you hundreds of dollars every week for all this necessary figure-work! Are you getting it done accurately and economically?

The Monroe Calculating Machine will do your "figure-thinking" for you by the simple method —direct from problem to answer. No complements or reciprocals to worry about.

Everybody is a trained operator on the Monroe. You simply "write" the problem on the standard flexible keyboard, turn the crank—forward to multiply or add; backward to divide or subtract —and there's your answer and proof for you in the dials and on the keyboard.

Send coupon for more complete information contained in "**Handling Figures at Spindle Speed**" and your request will be referred to the office nearest you of the 100 Monroe Branch Offices in United States and Canada.

MONROE

Reg. U. S. Pat. Office Calculating Machine

The "SHOW ME" Coupon—Mail it today

Monroe Calculating Machine Co., Woolworth Bldg., New York
Without obligating us, (check items desired)
☐ Send us a copy of "Handling Figures at Spindle Speed."
☐ Arrange for a demonstration in our own office.

Firm Name .....
Your Name .....
Address .....

Cotton 2-21

The Palmer Adjustible Thread Guide

For Ring Spinning and Twisting Frames

Easily Adjusted.

Extreme accuracy and permanence of setting.

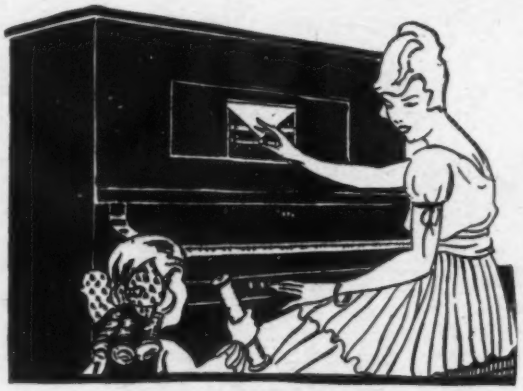
Cheapest of them all.

Mail guide-block for free sample.

Patented and manufactured by

THE I. E. PALMER COMPANY

Middletown, - - - Connecticut



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With our special "Play While You Pay" plan of purchasing a piano, there's no reason on earth why you shouldn't know the pleasure of having a player piano in your home.

A small cash payment secures its delivery. Write about our plan today.

Several bargains in used Stieff pianos.

CHAS. M. STIEFF, Inc.

Established 1842

M. D. Manning, Mgr.

215 S. TRYON ST. CHARLOTTE, N. C.

A BIG FACTOR IN MILL CLEANLINESS

Sanitary Washbowls have become necessities in the promotion of proper working conditions for employees, wherever factory cleanliness is considered worth having. Manufacturers no longer wonder if they can afford them. Instead, they realize that doing without them is the true cause of expense. Consequently the recognized standards in scores of mills today are

MEECO SANITARY WASHBOWLS

They should be the same in yours, because the same careful workmanship and the same simple, practical design which has proven so satisfactory for others will prove equally so for you.

Meeco Washbowls come in batteries, consisting of any number you may require. The variety of ways in which they may be installed always makes possible the greatest conservation of space without a sacrifice to convenience. They are finished in baked brown enamel with nickel-plated fittings and white enamel bowls. Thoroughly built and handsome in appearance.

Write For Catalog showing our full line of Stationary Wash Bowls, Bubbling Fountains, Metal Lockers, All Steel Stools and Chairs and Inset Wood Seats, Stock and Storage Racks, Metal Shelving, Metal Vault Fixtures, Improved Soda Kettles (40 to 60-Gallon), Water Heaters and Instantaneous Mixers, Work Benches and Bench Legs, Drawing Stands, full line of Plumbing Fixtures, etc.

Manufacturing Equipment & Engineering Co.

136 Federal St., Boston, Mass.

Address all communications to Framingham, Mass.

"Fun-Ful" Ocean Wave No. 201

THE FUN-FUL LINE

PLAYGROUND EQUIPMENT

NOW IS THE TIME

to plan your playground program for next spring.
ORDER YOUR EQUIPMENT SOON
for Spring delivery, thus avoiding disappointments in receiving goods on time.

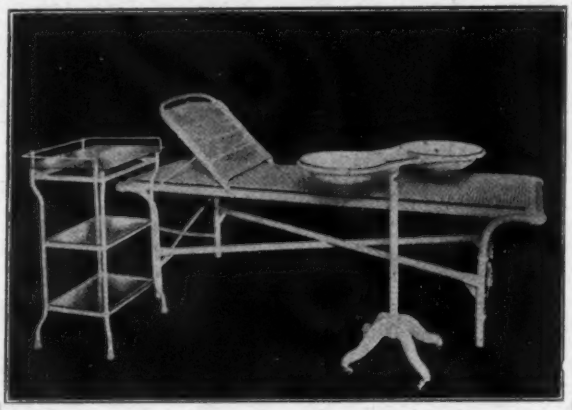
"EVERYTHING FOR THE PLAYGROUND"
WRITE FOR CATALOG NO. 5 TODAY.

HILL-STANDARD CO.

General Sales Office: ANDERSON, INDIANA.
Factories: ANDERSON, IND. KOKOMO, IND.

Edward Ferger, Southern Representative, 276 Lucile Ave., Atlanta, Ga.

F. H. Thomas Co.
Boston, Mass.



A First Aid Room or an Emergency Hospital For Your Employes will

Decrease your liability for industrial accidents.

Decrease time lost through temporary incapacity of your workers.

Decrease needless suffering from minor injuries and prevent minor injuries from developing into serious cases.

Increase morale and loyalty among your employees and give you opportunity to show your interest in the welfare of your workers.

The F. H. Thomas Company has equipped First Aid Rooms for over four hundred factories and mills, who have appreciated these facts, including the following Southern mills:

WINSBORO MILLS	WATEREE MILLS	WHITNEY MILLS
Winsboro, S. C.	Camden, S. C.	Whitney, S. C.

A modern Thomas equipped emergency room will put you also among the progressive owners who are saving money and advancing the conditions of their workers.

Write for information and advice, stating, if possible, the number and nature of your accidents.

SOUTHERN REPRESENTATIVE

F. H. Thomas Co.
689-691 Boylston St.

Boston. Mass.

ALL OVER The South
THEY ARE SPECIFYING

DOUBLE REGNAS DIAMOND

TRUCKS

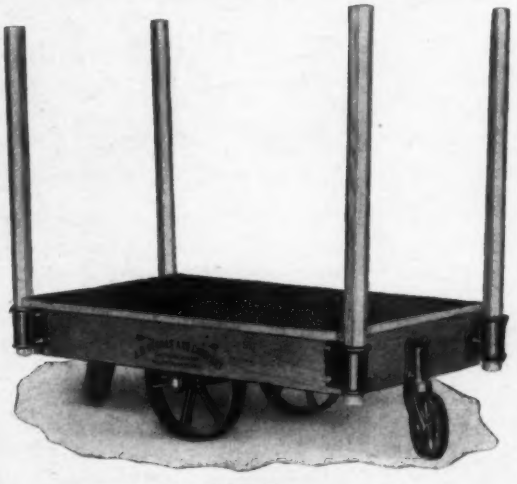


Fig. 200
GENERAL DUTY TRUCK
Size 27 x 48 Capacity 1500 lbs.

Over 300 Styles
A Truck for Every Purpose
SPECIAL TRUCKS TO ORDER

Prompt shipment on all standard sizes and styles of Hand Trucks and Platform Trucks.

J. R. Regnas & Co.
MANUFACTURERS
ATLANTA : : GEORGIA

THIS
CONVINCING COMPARISON
SHOWS THE SUPERIORITY OF

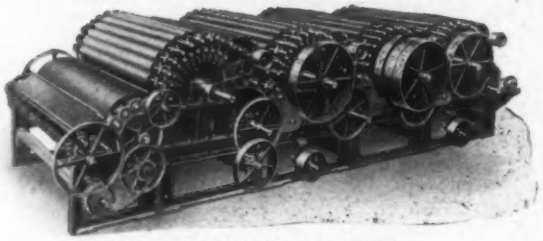
SIGNODE SYSTEM

OVER THE USUAL BALE TIE.
LET US SEND YOU FULL DETAILS
SIGNODE SYSTEM, INC.
CHICAGO ATLANTA
Boston New York Philadelphia San Francisco
Toronto

$\frac{5}{8}$" x .015 SIGNODE TIE	COSTS 12 % LESS PER FOOT	HOLDS UNDER 800 LBS. PULL	NO "SPIDER" TO INJURE HANDS
Compared with			
USUAL $\frac{5}{8}$" x .017 BALE TIE	COSTS 12 % MORE PER FOOT	BREAKS UNDER 500 LBS. PULL	DANGEROUS "SPIDER" OFTEN PRESENT

SMITH & FURBUSH MACHINE CO.
PHILADEPHIA, PA.

A Garnett Machine of this size will reduce to fibre hard twisted thread waste without materially shortening the staple. We also build smaller machines for working soft washes.



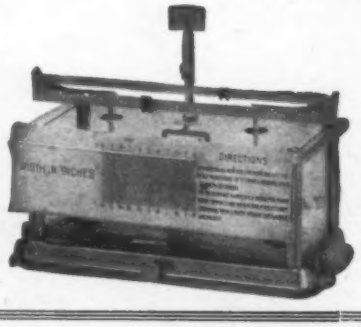
4 Cylinder 30-inch Garnett Machine.

This Garnett is built on our own sectional unit frame construction and contains many improvements which we will be glad to explain.

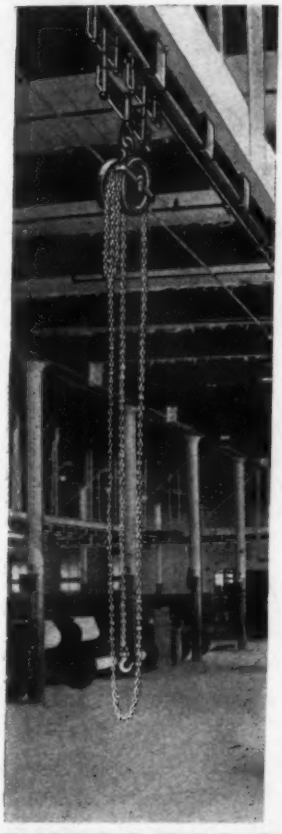
Ask for circular S-182.

Cypress Tanks
Wooden Packing Cases
ALL STYLES
Manufactured from
GEORGIA PINE POPLAR CYPRESS
WHITE PINE and GUM
Your Inquiry Solicited
Hightower Box & Tank Co.
Corner Humphreys and Glenn Streets,
BOX 1025 ATLANTA, GA.

TEXTILE SCALES



No. 5005. Gives yards per pound
No. 5000. Gives ounces per running yard
No. 5010. Gives yarn number for cotton yarns
No. 5015. Gives yarn number for woolen yarns
Used by U. S. War and Navy Depts.
CHRISTIAN BECKER'S ANALYTICAL AND SILK BALANCES
THE TORSION BALANCE CO.
Main Office, 92 Reade Street, New York
FACTORY: Jersey City, N. J.
BRANCHES: 31 W. Lake St., Chicago. 49 California St., San Francisco.



OVER-WAY

CONVEYING EQUIPMENT

Increases Output
Decreases Cost

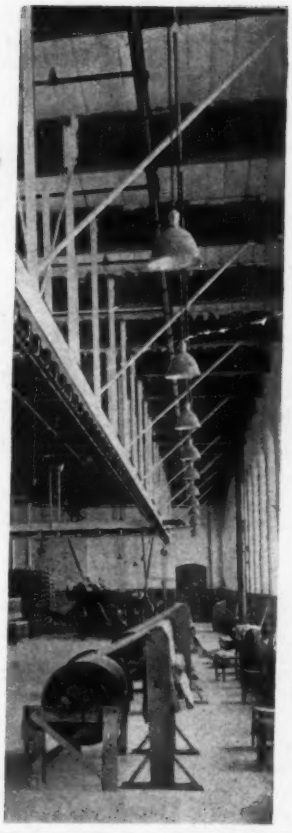
Can You Afford to Be Without It?

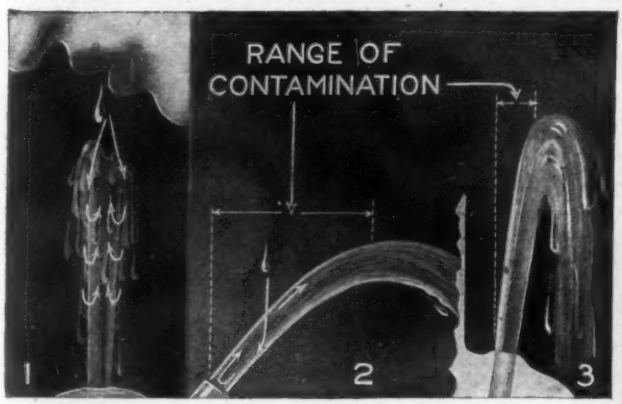
Handsomely illustrated book "OveR-Way Conveying Equipment" shows actual installations of OveR-Way systems and equipment in all kinds of establishments for lifting and carrying materials and products of every character.

Sent without obligation to anyone interested in overhead carrying equipment.

Ask for Catalog GA-23.

Richards-Wilcox Mfg. Co.
"A Hanger for any Door that Slides"
CHICAGO ST. LOUIS LOS ANGELES PHILADELPHIA AURORA, ILLINOIS, U.S.A. CLEVELAND LONDON, ONT. INDIANAPOLIS BOSTON NEW YORK MINNEAPOLIS SAN FRANCISCO





Don't Risk the Health of Your Operatives

Thousands of operatives are daily being subjected to disease through drinking fountains now in common use—fountains with a vertical stream that is almost as bad as the "public" drinking cup.

Science has condemned the vertical stream fountain and is now recommending the

R-S Vertico-Slant Stream Fountain

which is beyond doubt the most sanitary fountain because of the slight slant in the stream as shown in No. 3 of illustration above, which prevents water which has touched the lips from returning to the nozzle and the nozzle itself is buried so lips cannot touch it.

Write today for our new 74-page catalog.

RUNDLE-SPENCE MFG. CO.
MILWAUKEE WIS.

Drinking water in winter is as necessary as in summer time, But it must be dispensed in a sanitary manner.

A PURO Cooler with its PURO, JR. Fountain will keep your employees both healthy and happy.

Start a campaign now and clean out the "old tin drinking cup."

Install a PURO Cooler and thereby increase the productiveness of your employees.

PURO SANITARY DRINKING FOUNTAIN CO.
HAYDENVILLE, MASS.
E. S. PLAYER, Southern Sales Mgr.,
Masonic Bldg., Greenville, S. C.

LOCKWOOD GREENE

©

Originators of better methods for 88 years

THE mere existence of a record of 88 years of continuous service implies something above ordinary competency. Add to this a series of enduring engineering achievements in the development of the cotton mill and textile industries and you will appreciate the position now held in these fields by Lockwood, Greene & Co., Engineers.

It is a position of leadership fairly earned through 88 years of closest affiliation with cotton mill and textile interests.

We helped in the solution of early problems. Subsequent years of growth and expansion found us ready to cope with later problems and to envisage future needs. Today, Lockwood, Greene & Co., Engineers, continue to render to the cotton and other textile industries, an engineering service combining originality and practical knowledge.

So it is with confidence that we suggest that the solution of your engineering problems be entrusted to the experience and resourcefulness of this company.

LOCKWOOD, GREENE & CO.

ENGINEERS

EXECUTIVE OFFICE, 60 Federal Street, BOSTON

BOSTON ATLANTA CHICAGO NEW YORK
DETROIT CLEVELAND CHARLOTTE PHILADELPHIA
SANTIAGO, CHILE

LOCKWOOD, GREENE & CO. OF CANADA, LIMITED, MONTREAL
COMPAGNIE LOCKWOOD GREENE, PARIS, FRANCE

NOT YET! — USE ME!

Hampden *Sunray* MILL WHITE OIL PAINT

WALLS "Sun Surfaced" with Hampden *Sunray* Mill White Oil Paint gather and diffuse the very last rays of falling afternoon sun. This not only saves electric current but it keeps workers on daylight production for a longer time—which production is usually better in quality and greater in volume than production under artificial light.

Hampden *Sunray* Mill White is an oil paint with a long lived surface that is smooth and hard but sufficiently flexible to withstand vibrations—a surface so white that it diffuses an unusually high percentage of light. It is washable, too.

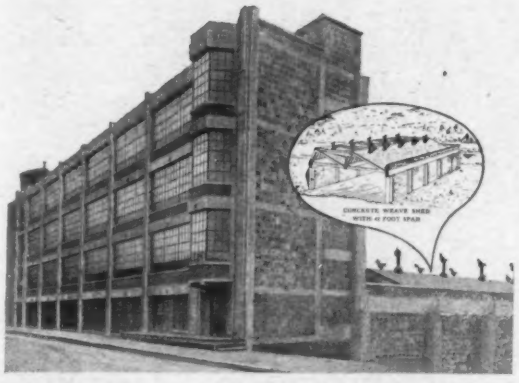
Three finishes: Gloss, Eggshell (semi gloss), Flat. Further particulars mailed on request, also our booklet "Whitest White," which contains useful information about industrial lighting.

PAINT Hampden COATINGS

HAMPDEN PAINT AND CHEMICAL CO.

Makers of Good Paint for 68 Years

DIVISION E, SPRINGFIELD, MASSACHUSETTS



Factory, and Weave Shed with 42-foot Span, Concrete Saw-tooth Roof. Designed and constructed for Sidney Blumenthal & Co., Inc., at Shelton, Conn.

Expect the Utmost

THE Thompson & Binger organization is not new, nor old; not small, nor large. It is old enough to have acquired reputation, altho this reputation is not of such long standing that it need not be lived up to; its personnel is far too large to be designated small, but not so large that one of the two principals does not know the status of your job, every day.

You, as a client of Thompson & Binger, Inc., should expect the utmost in design and construction.

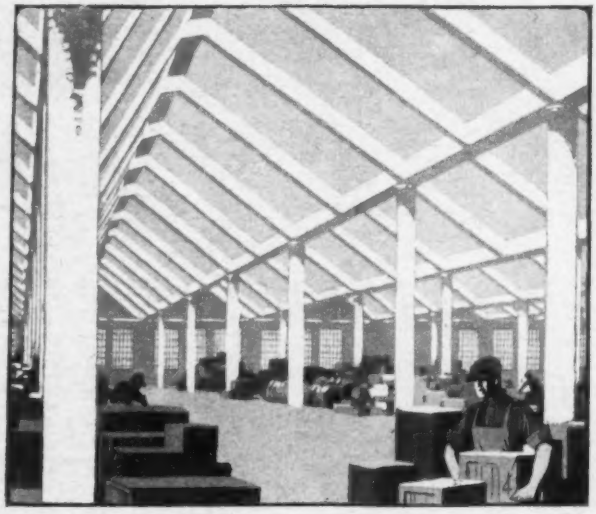
THE ENDICOTT-JOHNSON WORKERS have chosen us to do the designing, engineering, and construction of all concrete buildings to be erected by them.

THOMPSON & BINGER
INC.
ENGINEERS & CONTRACTORS
CONSULTATION - DESIGN - CONSTRUCTION

NEW YORK
280 MADISON AVE.

SYRACUSE
GURNEY BUILDING

CONCRETE



Put Daylight on the Job

DAYLIGHT is a panacea for many business ills. Make it work for you from whistle to whistle. Paint the interior of your plant with Dixielite, the original daylight saver.

It helps speed up production; first, by making all work easier to see; second, by eliminating those mistakes due to dark working conditions.

Light tends toward cheerfulness. Dixielite goes far towards keeping your employees happy and contented; and contentment has an actual dollar and cents value to your organization.

DIXIELITE

The Original Daylight Saver

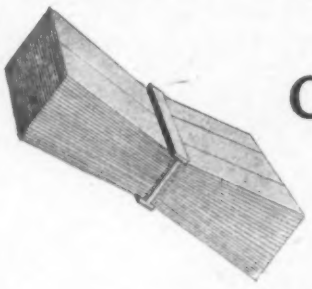
It is the perfect white finish for walls and ceilings of mills, factories, and warehouses. Once applied, Dixielite spreads daylight evenly and brilliantly to every corner of the room. As long as there is light outside, Dixielite works inside. It lowers electric bills. It makes a place more sanitary. It saves the eyes of your workmen. Dixielite is made in gloss, semi-gloss, and flat finishes. Let us send you a sample.

Bay State Liquid Paints answer every painting question. There is a paint, stain, varnish or enamel for every conceivable purpose. INOROUT, the all-round varnish is equally superior on inside or outside jobs. It can't be beaten.

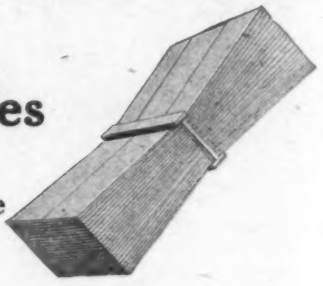
WADSWORTH, HOWLAND & CO., INC.
Paint and Varnish Makers

BOSTON, MASS.
New York Office, Architects' Bldg.
Philadelphia Office, 1524 Chestnut St.

W. A. WILLIAMS, Southern Representative
P. O. Box 322 Greenville, South Carolina



"Never-Rot" Creosoted Pine Shingles

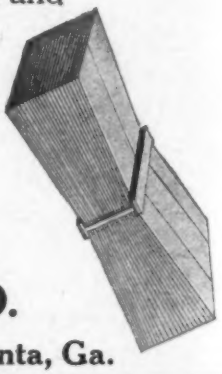


Give Longer Life at Less Expense Than the Highest Price Untreated Shingles

Our "NEVER-ROT" creosoted pine shingles are thoroughly impregnated with pure refined creosote by our special Hot and Cold treatment, which prevents their decay, and by its waterproofing action lessens warping and shrinking.

Reduce Your Annual Roofing Costs 60% by the use of "Never-Rot" Creosoted Pine Shingles

Write us for carload prices delivered F. O. B. cars at your city.



GULF STATES CREOSOTING CO.

P. O. Box No. 1022 **Atlanta, Ga.**

Are Sales Off?

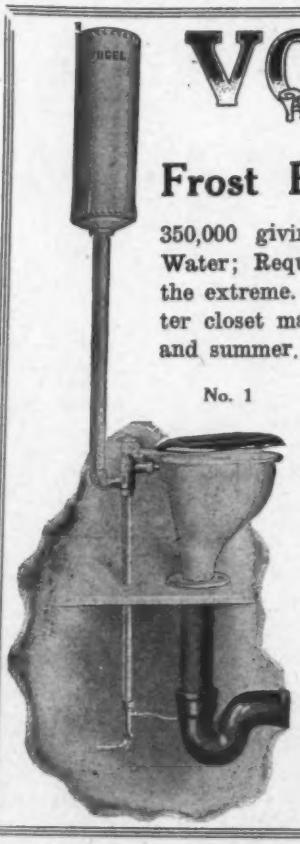
Are you storing your finished product ready to make "Immediate Delivery?"

J. D. COLLINS

STORAGE EQUIPMENT
926 GRANT BLDG.,
ATLANTA, GA.

has the equipment that will reduce your storage and handling expenses. Tiering machines, Electric and hand trucks, Gravity and Power Conveyors of all kinds.

Catalogs and full information furnished upon request.



VOGEL PATENTED

Frost Proof Closets

350,000 giving satisfaction. Save Water; Require no Pit; Simple in the extreme. The most durable water closet made. In service winter and summer.

No. 1

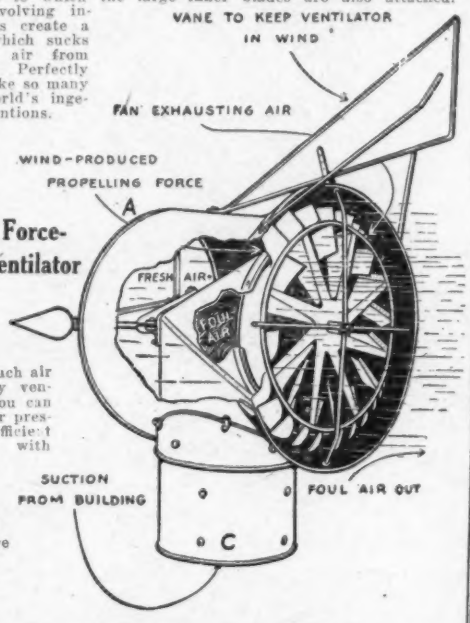
- Enameled roll flushing rim bowls.
- Heavy brass valves.
- Strong hardwood seat. Galvanized tank.
- Malleable seat castings will not break.
- Tested under hydraulic pressure before leaving factory.

ASK YOUR JOBBER

JOSEPH A. VOGEL CO.
WILMINGTON
DELAWARE

The Wind-Mill Principle Applied to a Ventilator

Note the illustration! The fresh air passing over the funnel comes in contact with the small outer blades, thereby propelling the wheel to which the large inner blades are also attached. These revolving inner blades create a vacuum which sucks the foul air from below. Perfectly simple—sike so many of the world's ingenious inventions.



Carlisle Force-Draft Ventilator

displaces from 5 to 6 times as much air as ordinary ventilators. You can replace your present inefficient Ventilators with fewer and smaller sized "Carlisles" and get more ventilation! Write for descriptive folders.

CARLISLE & GALE CO.

569-577 Albany St. Boston, 18, Mass.

KEEP YOURSELF PREPARED

Get one of these

Keyseaters

This tool will do the work that any other internal keyseater will do. Milled keyseats are the best keyseats and this tool mills them.

Alignment

must come good, it can't be missed; look at the guide following up the cutter. The miller is conducted through the hole and fits the hole exactly, therefore the accuracy in alignment. The other day we made a Miller to mill internal keyseats 22 in. long. Don't you need one longer?

Get Catalog C

National Machine Tool Co.

2274 Spring Grove Ave., Cincinnati, O., U. S. A.
Southern Representatives
Smith-Courtney Co., Richmond, Va.
Montgomery & Crawford, Spartanburg, S. C.

For Wood or Metal Roofs—

SCO-CO Heavy Service Paints

A WATERPROOF, metal-preservative paint that protects your roof from the sun, rain and wind, making it impervious to the ravages of time and the elements.

"Made to Wear Where Wear is Hardest"

SCO-CO HEAVY SERVICE ROOF PAINT offers a sure protection for your roof at a very reasonable cost. Write today for particulars and prices to—

THE SOUTHERN COTTON OIL CO.

Paint Products Division

Savannah, Ga. (1)

H. NEWTON MARSHALL CO.

CONTRACTOR PAINTERS

ATLANTA, GA. BOSTON, MASS.

D. R. Hall, Southern Manager
501 Trust Co. of Ga. Building,
ATLANTA, GEORGIA.

Service *Efficiency* *Low Cost*

Olympia Mill, Columbia, S. C.

For twenty years our specialty has been painting mills and other industrial plants while in full operation without interrupting output or adding to the cost of painting.

Goods in Process Carefully Protected.

Write us for estimation, can furnish more than five thousand mills and industrial plants throughout the country for reference.

COOLEDGE HYGRADE

C THE CH LINE H

"Best for the Southern Climate"

C-H Bungalow Shingle Stains

For Shingle roofs and weather-boarding

C-H Home Paints

For Exterior and Interior Use

C-H Perma White

Interior gloss mill paint

Let us Send Booklet and Color Card Also names of Mills and Mill Contractors that have used our paints

"IMMEDIATE SHIPMENTS"

Just write on your letter-head— "Send Your Catalog"

F. J. COOLEDGE AND SONS

ATLANTA GA. SAVANNAH

Manufacturers of paints, stains and varnishes
Jobbers of window and building glass, and wallboard

SAVE WASTE

Ball Bearings on the measuring rolls of slasher warpers will do it.

AldricH MachinE

Ball WorkS Bearings

Greenwood, S. C.

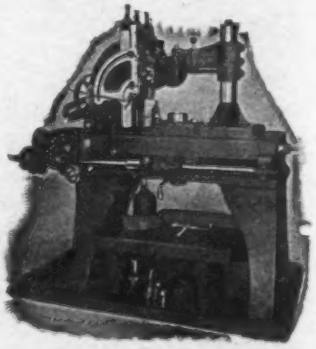
Full Automatic, Semi-Automatic and Hand Operated

Gear Cutting Machines

Especially adapted for use in Cotton Mills Hundreds now in use. Send for Special Circulars.

The D. E. Whiton Machine Co.,

NEW LONDON, CONN.



THE JOHNSON FRICTION CLUTCH

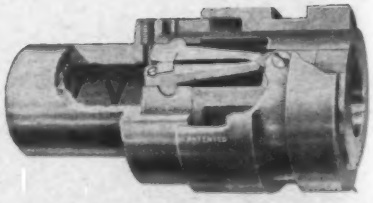
A Better Control for Textile Machinery

You will find the Johnson Clutch a most satisfactory means of driving textile machinery. More efficient and more convenient than the tight and loose pulley. Equally desirable on motor drives.

Made in both single and double types to fit standard pulley sizes. Clean, compact and durable. Grips smoothly and is easily adjusted to any tension.

Ask for the Johnson Clutch on your new machine equipment.

Ask for our Catalog "G"



Single Clutch Broken Away.

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN.

Jenkins Extra Heavy Iron Body Gate Valves

For 250 pounds working steam pressure, or 400 pounds working water pressure.

Double face, solid wedge type. Extra heavy and specially made to meet the requirements of heavy pressures and high temperatures in modern high pressure power plants.

Genuine Jenkins Valves are known by the name and Jenkins Diamond Mark cast on the body—they are obtainable through supply houses everywhere.

Figure 204-B

Outside screw and yoke, rising spindle with by-pass flanged.

REG. U.S. PAT. OFF. TRADE JENKINS MARK

Jenkins Bros

JENKINS BROS.

New York, St. Louis, Chicago, Boston, Philadelphia, San Francisco, London, Havana, Washington, Pittsburgh, Montreal

FACTORIES: Bridgeport, Conn., Elizabeth, N. J., Montreal, Can.

Jenkins Valves

SINCE 1864

CRESSON-MORRIS CO.

POWER TRANSMITTING MACHINERY

Merit Plus Recognition

"The heights by great men reached and kept were not attained by sudden flight."

Time, skill and effort must also proceed merit as surely in machinery as in men.

Time, skill and effort must also proceed merit in order to obtain and maintain for merit the recognition it deserves.

The great number of large installations of Cresson-Morris Power Transmitting Machinery is proof of both the merit and the recognition of the merit that nearly three score years of skill and effort have endowed it with.

The cumulative knowledge of all this experience is always available to you in the recommendations of our engineers.

CRESSON-MORRIS COMPANY

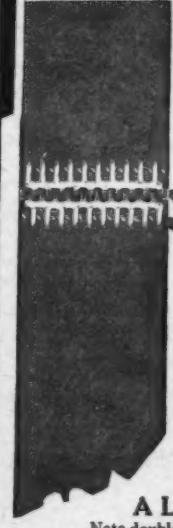
ENGINEERS—FOUNDERS—MACHINISTS

PHILADELPHIA, PENNA.

Branch Office, 141 Milk St., Boston, Mass.

25

The World's Greatest Belt Lacing



Simple, Strong, Economical!
—Preferred by All Who Know It

Under every imaginable condition of service—in every civilized country in the world—**on every kind of leather, cotton, rubber or balata belt**—Alligator Steel Belt Lacing has proven itself best.

"Never Lets Go"

ALLIGATOR

TRADE MARK REG. U.S. PAT. OFFICE

STEEL BELT LACING

Nothing Needed but a Hammer

In a working time of only three minutes the average belt can be laced with Alligator Steel Belt Lacing. No special skill or training needed. No tool but a hammer to insure a perfect joint.

A Large Surplus of Strength

Note **double staggered teeth** (shown in illustration) they give the extra strength to Alligator lacing.

Short flexible joint insures smoothness of operation. Sectional Steel Rocker Hinge Pins (patented)—form frictionless "rocker" for the flexible joint. In damp or heavy work, where other lacing pulls out, Alligator Steel Belt Lacing holds.

Ask Your Jobber—or Write Now For Prices, Samples and Full Details Write today. Let us send you prices, samples and full details regarding Alligator Steel Belt Lacing. Made for belts of all sizes from tape to ¼-inch thickness.

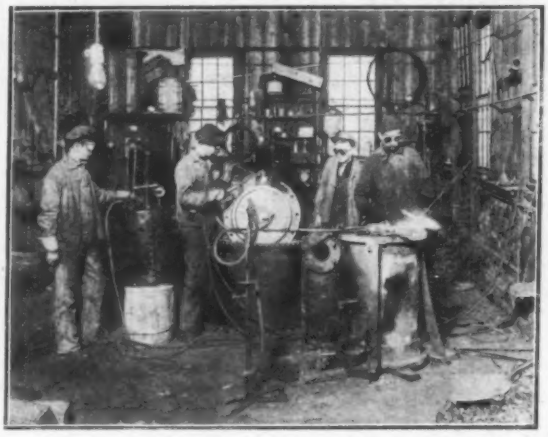
Hundreds of thousands of men the world over are using no other lacing than Alligator—The World's Greatest Belt Lacing. Write us at once.

FLEXIBLE STEEL LACING COMPANY

4619 Lexington Street, Chicago, Ill., U. S. A.

135 Finsbury Pavement, London, E. C., England

QUICK WELDING SERVICE



Welding a cylinder, 2000 lbs. and cylind r h ad 3 inches thick—weld 20 inches —for Block Coal Co., Block, Tenn.

DON'T DISCARD YOUR BROKEN PARTS OUR SERVICE SAVES TIME AND MONEY

There is no need of discarding broken machines and machine parts—there is no need of shutting down and waiting an indefinite length of time for delivery of new parts.

Many mills know through experience that should a machine breakdown occur, it can be put back in operation quickly by calling on AUTOGENOUS.

We have just completed the repair on the crosshead and main bearing of a 1200 H.P. engine for the Brookside Cotton Mills. Practically every cotton and knitting mill in the vicinity of Knoxville has taken advantage of and profited by AUTOGENOUS Welding Service. Many of these jobs were extra large and caused a shutdown of the plant, and much time was saved by our quick service.

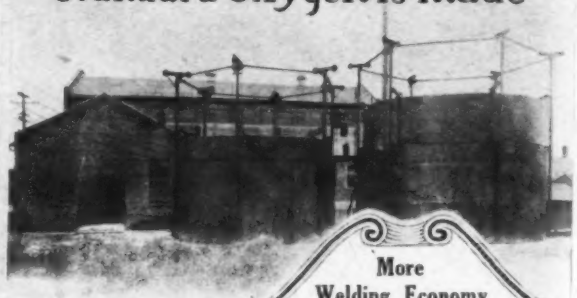
No matter how bad the break, no matter how small or large the machine or part, AUTOGENOUS Welding Service can save you money.

Full Details Sent on Request
WIRE, PHONE OR WRITE

AUTOGENOUS WELDING CO.

Oxy-Acetylene and Cutting in All Metals.
903-5 No. Central Ave., Junction Central and Broadway, Knoxville, Tenn.

One of the Plants where Standard Oxygen is made



More Welding Economy

STANDARD is the first company in the South to manufacture oxygen, and satisfaction is insured by prompt shipments, full measure and absolute purity of oxygen. This satisfaction is attested to by the fact that our business has increased over 800% in the last two years. Over 100 men are now using Standard Welding Apparatus and Supplies.

Our representatives will be glad to call and explain in full and make a demonstration of STANDARD Apparatus in your own shop. No obligation. Write for catalog.

Order your oxygen from our station nearest you.

Standard Gas Products Co., Inc.
Atlanta, Chattanooga, Gretna, La.

STANDARD OXYGEN
WELDING APPARATUS & SUPPLIES

LANE'S UNIQUE
RATCHET TOOLS

"OFF-SET" RATCHET SCREW DRIVER

This tool was designed for working in close quarters, where the work cannot be reached by a straight handled screw driver.

The Ratchet Features enable the operator to use this Tool in a very narrow space and at the same time secure a very great leverage.

The BITS are milled square at tips, thus securing a perfect fit in screw slots, which also prevents lifting out of the slots, as is the case with tapered tips.

The handle is 6 inches in length, drop-forged and case-hardened. Two accurately milled Bits, made from highest grade screw driver steel, are furnished with each Tool.

Packed in individual Paper box.

Weight, 5 ounces.

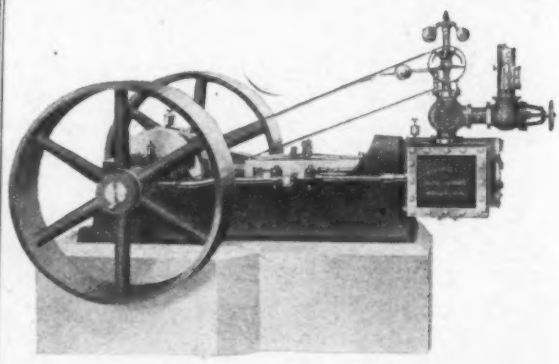
LIST PRICE $2.00

Sold by Jobbers Throughout the World.

Manufactured by

WILL B. LANE UNIQUE TOOL CO.

180 N. Dearborn St., CHICAGO, ILL.

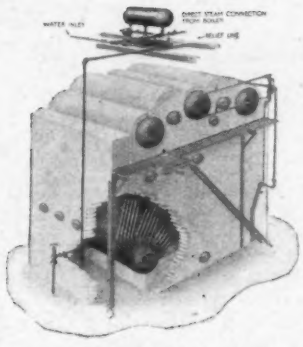


J. S. Schofield's Sons Co.

Macon, Georgia

MANUFACTURERS OF

High Pressure Return Tubular Boilers,
High Grade Stationary Steam Engines,
Tanks, Stacks, Stand Pipes.
Heavy Castings and Wrought Iron Works.



DRAINS CONDENSATION FROM STEAM HEATED SURFACES--- REDUCES COAL CONSUMPTION

Condensation lowers the efficiency of steam-heated equipment—increases operating costs.

With the Morehead Back-to-Boiler System draining steam-heated surfaces of all condensation as it forms, production costs are reduced to a minimum.

The Morehead System not only keeps every ounce of condensation drained from steam-heated equipment, but returns the condensation to boilers as pure hot feed water—ready to be used again, and lowers fuel costs 20 to 50 per cent.

It removes the need for a steam pump altogether.

It can be easily added to your equipment without disturbing the operation of your power plant.

We will gladly refer you to textile manufacturers in your locality who have lowered their operating costs 20 to 50 per cent with the Morehead System. Write for catalog.

Morehead Manufacturing Co.
Detroit, Michigan

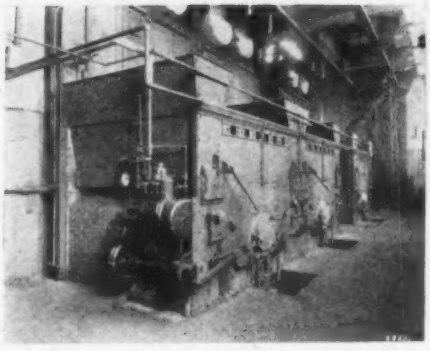
Canadian Morehead Mfg. Co., Woodstock Ont.,
For Dominion of Canada.

Positively Drains All Types of Steam Apparatus — Delivers Condensation And Feed Water to Boiler Under All Conditions at Maximum Temperature — Saves Fuel Bills 6 to 1 Ratio

Morehead

"BACK-TO-BOILER-SYSTEM"

DETROIT STOKERS



Saving Boilers

In 1916, the Spicer Mfg. Corp., of S. Plainfield, N. J., found that their output was being limited because of a steam shortage. They could not maintain 175 lb. steam pressure with low grade coal—the only kind they could get.

The thing ordinarily done under such circumstances is to install more steam making equipment—more boilers. Incidentally, this is the most expensive way to get more steam. It is the last thing to do instead of the first.

But the Spicer Mfg. Corp. installed four Detroit "V" Type Stokers under their 150 h.p. boilers. They saved the cost of new boilers. They got more steam at a fraction of the cost.

Indicated by the fact that in 1918 when they increased their h.p. capacity with two 300 h.p. boilers, they specified Detroit Stokers with Detrick Flat Arches.

Detroit "V" Type Stokers will enable your plant to reduce coal and labor bills. They will secure more steam from present boiler equipment.

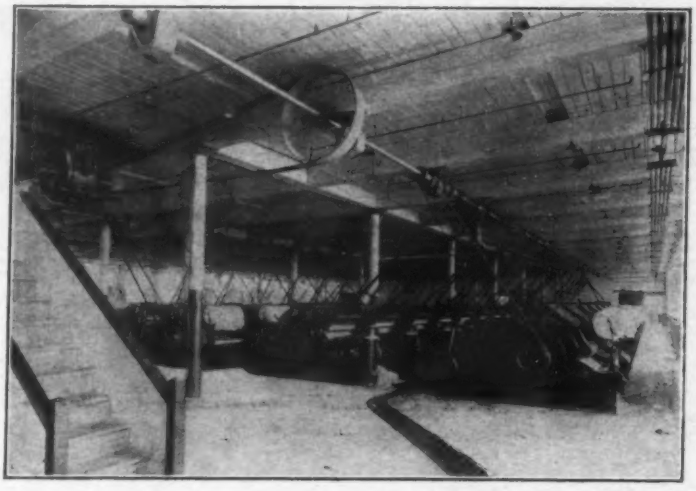
Allow our engineers to show you how this can be done. Our Stoker Catalog will indicate some money saving possibilities that your plant may be overlooking. Let us send you a copy.

Detroit Stoker Company
7336 Woodward Ave., Detroit, Mich.

Branches: Chicago, Cleveland, Cincinnati, New York, Pittsburgh, Atlanta, Philadelphia, Boston.

SAVE COAL

Textile Motors



Allis-Chalmers

Textile Motors are the results of continued careful observation and study of motor application in the Textile Industry.

Write for Textile Bulletin

ALLIS-CHALMERS

MILWAUKEE, WIS. U. S. A.

Speed in Service is Only Rivaled by Accuracy
Each Would Be Useless Without the Other

Unfailing Service

In the struggle and stress of modern business life every moment of delay represents a loss of time and money which cannot be regained.

When promptness, accuracy and dispatch are the vital elements in the delivery of electric equipment or supplies it is natural to turn to the Carter Electric Company for service.

This is an organization whose members are trained to meet the demands of any emergency and this organization is ready to serve you on an instant's notice.

If your requirements cover Rubber Conduit Wire, Switches, Safety Switches, Wiring Devices, Fuses, Lamps or other electric supplies, it is only a matter of a few hours before we can place them in your hands.

This is because our warehouses are always fully stocked—everything you may need and in large quantities—and with every modern facility for handling your business the Carter Electric Company pledges you **Unfailing Service.**

Carter Electric Company

63 Peachtree Street, Atlanta

Quick Action

Modern business demands it. Time is the most valuable asset of the executive.

STROMBERG-CARLSON
INTER-COMMUNICATING SYSTEMS

add hours to the business day—eliminate loss of precious minutes—save endless unnecessary footsteps.

They are easily installed—require no switchboard or operator. Their operation is simplicity itself.

Push *ONE* Button *ONCE*—and Talk.

Dixie Electric Equipment Co.
INDUSTRIAL ELECTRICAL EQUIPMENT
Interior Telephones—Fire Alarm Apparatus.
Watchman's Clock Detectors.
Electric Clocks—Riot Alarms—Code Calling Systems.
A Southern Concern—Giving Service to the South.
Data and Complete Information on Request.
37 Peters St. Bell Phone Main 826.
ATLANTA, GA.

HOTEL Sinton

CINCINNATI

THE courtesy of the Hotel Sinton's personnel and the fine cuisine of this modern hostelry are points of note among commercial travelers and tourists.

THE HOTEL SINTON offers extensive accommodations. A fine, new 300-room wing is to be completed July 20, 1920.

Cincinnati's Leading Hotel
700 Rooms, all with Bath or Shower.

Management
JOHN L. HORGAN

"NATIONAL" BRACKETS

NATIONAL Brackets are especially adaptable for use in carrying power lines in industrial plants, as well as for outside construction work. They are practically universal in application; they do not require tie wires; they are furnished complete with insulators. Write for Bulletin 602.

National Metal Molding Co.

General Offices: Pittsburgh, Pa.
Atlanta Office:
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E. A. CUTTS COMPANY
Cable Address: "CUTTS"
COTTON BROKERS
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Office Phones—478—2713—Postal Phone
Long Distance—9929
Branch Office: E. A. CUTTS & SON, Augusta, Ga.

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STENCILS — METAL CHECKS — RUBBER STAMPS

Send for Catalogue
Stencil Work for Cotton Mills Our Specialty

SOUTHERN STAMP & STENCIL CO.
7 W. Mitchell St.
ATLANTA GA.

WELDING & REPAIRS

SOUTHERN WELDING & MACHINE CO.
190 COURTLAND STREET ATLANTA, GA.
Gear Cutting and Machine Work.
No job too large or too small for us.
We specialize in cotton mill and oil mill welding and machine work.
Oxy-Acetylene and Electric Welding

Advertising conserves the Manufacturer's time by acquainting him with a service or product at his leisure long before the need for such arises.

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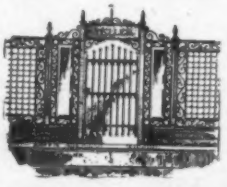
Cast Iron Columns
FOR
COTTON MILL CONSTRUCTION

American Cast Iron Pipe Company
COLUMN DEPARTMENT BIRMINGHAM, ALA.
NEW YORK OFFICE: 261 BROADWAY



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WINDOW GUARDS
WIRE CLOTH
Established 1835.
DUFUR & CO.
309 N. Howard St., Baltimore, Md.

PLUMBING and HEATING
POWER & HAND PUMPS DAIRY SUPPLIES
PROMPT SERVICE.
HACKNEY BROTHERS CO.
No. 6 West 5th St., Charlotte, N. C.

J. E. ROBBINS & SONS
PRACTICAL WELL DRILLERS
208 W. Coffee St.
P. O. Box 87 Phone: Long Distance 2985
Greenville, S. C.

GOODE CONSTRUCTION COMPANY
GENERAL CONTRACTORS
Charlotte, N. C.

GUDE & CO., Builders
CANDLER BLDG., - ATLANTA, GA.
All classes of buildings constructed promptly and efficiently and at reasonable prices.

WELLS
HUGHES SPECIALTY WELL DRILLING CO.
CHARLESTON ATLANTA
Established 1885

Commission Merchants, Yarn Dealers, Cotton Dealers and Brokers, Banks, Etc.

H. Ray Paige, Pres. J. A. Mandeville, Vice-Pres. J. H. Schoolfield, Secy. and Treas.

Southern Cotton Yarn Co., Inc.

1 Madison Avenue, New York City

SELLING AGENTS FOR

SOUTHERN MILLS

Carded—Combed Yarns

4's TO 120's SINGLE AND PLY

Selling Direct to Consumer.
NEW ACCOUNTS SOLICITED.

The Recognized Standards of Quality

COTTON YARNS

Our Fine Yarns Make Fine Fabrics

The manufacturers of a number of America's well known textile products can vouch for the strength, uniformity, cleanliness, and better weaving and knitting qualities of our yarns.

The yarns we spin for knitting, weaving, laces and converting, are furnished in all twists on skeins, cones, tubes and warps:

36s to 80s Single and Ply Combed Peeler Right Twist. 36s to 50s Single and Ply Double Carded Peeler, Right or Reverse Twist.

20s to 60s, 2, 3, and 4 Ply, Combed Peeler, Reverse Twist.

Our products are sold direct and exclusively through our General Sales Offices:
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H. A. FLORSHEIM, Sales Manager
Long Distance Phone: Gramercy 812
New England Representative
H. D. Skinner,
212 Summer St. Boston, Mass.

Gray Manufacturing Co.
Arrow Mills, Inc.
Parkdale Mills, Inc.
Flint Manufacturing Co.
Arkray Mills, Inc.
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Myrtle Mills, Inc.

Weimar Bros.

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Works, 2046-48 Amber Street,
PHILADELPHIA, PA.

MANUFACTURERS OF

Cotton Mercerized Tapes, Spool Tapes, Bindings and Narrow Fabrics for Underwear and other Trades.

IF YOU NEED BANKING SERVICE

in the South,
and especially in Georgia

You need The Citizens & Southern

Capital and Surplus $4,500,000

The Citizens & Southern system has completely equipped offices in Atlanta, Savannah, Macon and Augusta.

Each of these offices is connected with the others by direct private wires.

If you are a customer of either office, and want information or service of any kind from the other cities these wires and the complete organization are at your service.

Hundreds of direct correspondents all over the south makes it possible to give you practically the same service wherever you want it.

The Citizens & Southern Bank

Atlanta—Marietta at Broad

Savannah Macon Augusta

No account too large, none too small"

ESTABLISHED 1872

H. & B. BEER

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HENRY BEER EDGAR H. BRIGHT
J. WILLIAM BARKDULL C. MORGAN ABRAMS

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LINEN YARNS

For Weaving, Knitting and all Purposes.

TURKEY RED YARNS

For Towel Borders, Towellings and Bleaching Cloth

Linen Jacquard Harness Twine

And Every Description of Linen Thread and Twine

115 Franklin Street, : NEW YORK

The pilgrim spirit lives

FIRM IN FAITH that beyond the horizon are other Lands of Opportunity, courageous sons and daughters of New England adventure far from home to follow their careers.

They prosper in blistering tropics, under flickering Northern Lights, in great jostling cities, on the Seven Seas and beyond the outposts of civilization. They are vigorous, living evidence of New England initiative.

Copies of our booklets on foreign trade development will be sent on request.

THE NATIONAL SHAWMUT BANK has also blazed new trails to broader opportunities. Founded as a local bank 85 years ago, this institution is now the centre of an international system of financial service. In every state and foreign land — in important cities and distant ports — connections have been established. Today, there are 1600 of these branches and correspondents.

Wherever your markets for raw material or finished goods may be — *or how unusual a personal commission you may have for us to execute* — we are organized to protect your interests *in any land* by a quick, accurate service of exceptional scope.

THE NATIONAL SHAWMUT BANK *of* BOSTON

Resources far exceed $200,000,000

TEXAS AND CALIFORNIA

If you contemplate making a trip to Texas or California this winter, ask Ticket Agent about **The West Point Route.**

His answer will be that they have the best service, quickest time, highest grade standard and tourist sleepers, club cars, observation cars and dining cars.

See that your ticket reads via Montgomery and New Orleans.

Ask nearest Ticket Agent for rates and schedules, or communicate with the undersigned.

J. P. BILLUPS
General Passenger Agent
The West Point Route
Atlanta, Ga.

1865 The Oldest National Bank in the Cotton States 1920

Business Building by Centuries

"Makers of fine footwear since the days of George III;" "Unrivaled for fifty years;" "This corporation has granted insurances for two hundred years;" "Known for upward of a century;" "Founded 1815."

In the Heart of Atlanta—
The Heart of the South.

These are random phrases from advertisements in a recent trade supplement of The London Times.

We lay stress on age in American business. A recent inquiry as to how many American business houses could look back on a century of service, yielded an incomplete list of but 58.

Yet AGE IS AN ASSET. It is a promise of FAIR DEALING. A HISTORY OF HONESTY.

The First National Bank of Philadelphia established in 1863, is the oldest national bank in the United States. The Atlanta National Bank, established just two years later in 1865, when Atlanta was in ashes, is the oldest national bank in the Cotton States.

Fifty years of scrupulous care in guarding the interests of every depositor, has made the Atlanta National Bank not only a wonderful successful business institution, but is an assurance that it will contine to be a REAL AND VITAL PART OF THE GREAT THROBBING COMMERCIAL LIFE OF THE SOUTHEAST.

Atlanta National Bank

OFFICERS

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CLASSIFIED ADVERTISING

POWER AND EQUIPMENT

POWER

48—823-H.P. Sterling Boilers, type M-30, 200 lbs. pressure with Westinghouse 8 retort stokers.
5—500-H.P. Keeler water tube boilers, 160 lbs. pressure with Wetzel stokers.
40—18x36, 350-H.P. Allis-Chalmers Corliss Engines, heavy duty, double eccentric.
1—3500 K.W. General Electric Condensing Turbine, three phase, 60 cycle, 2300 volts.
2—3000 K.W. General Electric Condensing Turbines, three phase, 60 cycle, 2300 volts.
2—1000 K.W. Allis-Chalmers Non-Condensing Turbines, three phase, 60 cycle, 2300 volts.
800—Motors, all 3 phase, 60 cycle, 440 and 2300 volts, standard makes, from one-quarter to 300 H.P.
3—No. 5 Allis-Chalmers Vertical High Vacuum Jet Condensers.
1—Westinghouse-LeBlanc Condenser (for 3500 K.W. Turbo).
6—15-26x20x24 Compound Duplex L. D. G. Compressors, feather valve, 60 lbs.
2—9-17x15-9x12 Compound L. D. G. Compressors, 110 lbs.

SUPPLIES

Acid Pumps
Machine Tools
175 miles Pipe, all sizes
Corrugated Iron
2000 Wood Tanks
Steel Tanks
Belting
Shafting and Pulleys
Ice Plants
Acid Recovery Plants
Machine Tools
Mill Supplies
Plumbing Materials
Heating Equipment
Chemical Equipment
Steel Buildings
Building Material
Restaurant Equipment
Acid Making Plants
Causticizing Plant

PUMPS

10—14-inch Worthington 8600 gpm, 152′ head Centrifugal Pumps, dc to 300 H.P. General Electric Motors.
2—10-inch Worthington Type S Centrifugal Pumps, dc to 150 H.P. Westinghouse, 3 phase, 60 cycle, 2300 volt Motors, 3750 gpm, at 130′ head.
4—14-inch Worthington Type S, 7500 gpm, 130′ head, 300 H.P. General Electric Motors, 2300 volts.
6—14-inch Allis-Chalmers Type S, 6500 gpm, 150′ or 8100 at 90′ dc to Steam Turbine.
6—16-inch Allis-Chalmers Type S, 8500 gpm, 90′ head dc to Steam Turbine.
3—8-inch A.W.W., 1000 gpm, Centrifugal, dc to 100 H.P. Westinghouse, 2300 volt Motors, 1000 gpm, 125 lbs.
6—14-20x7½x18 Worthington Compound Duplex O.P. Pumps, 400 gpm, 300 lbs. pressure.
10—25-38x4-5½x24 Worthington Tandem Compound Duplex Pumps, 150 gpm, 3600 lbs. pressure.
3—20x12x16 Duplex Underwriters Fire Pumps, 1500 gpm, 100 lbs. pressure.
75—Diaphragm Pumps, all sizes, gasoline, electric, and hand operated.

Write or wire for specifications and prices on the above new and practically new equipment of the government's $87,000,000 OLD HICKORY project.

THE NASHVILLE INDUSTRIAL CORPORATION
OLD HICKORY, TENN.

Can Offer Attractive Prices on the Following Machinery

3—40″ H. & B. or Kitson Finish Lapper.
1—40″ Potter Atherton or Kitson Breaker Lapper with Automatic Feed.
1—72″ Kitson Willow
1—Standard Saco-Lowell Willow, 1919 model.
2—Kitson Thread Extractors.
4—Saco Pettee Cards, 12″ coil.
16—Pettee Cards, 12″ coil.
5—Hetherington Cards, 12″ coil.
1—James Smith 2 cylinder, 30 x 60 Garnett Card.
10—Head Lowell Drawings 4 x 6 delivery, 12″ coil metallic rolls.
6—Head Whitin Drawings, 6 delivery, 12″ coil metallic rolls.
1—12x6 H. & B. Slubber 56 spindles.
1—12x6 Providence Slubber, 68 spindles.
2—12x6 Woonsocket Slubbers, 60 spindles each.
2—10x5 Providence Speeders, 102 spindles each.
1—10x5 H. & B. Speeder, 108 spindles.
5—8x4 Providence Speeders, 104 spindles each.
1—8x3½ H. & B. Speeder, 152 spindles.
2—7x3¼ Saco Pettee Speeders, 152 spindles each.
35—F. & J. Spinning Frames, 208 spindles to 272 spindles each, 3″ gauge, 2″ ring.
4—5x4 Saco-Pettee Spoolers Gravity spindles, belt bobbin conveyor, 80 spindles each.
1—4x6 Whitin Spooler, 100 spindles, Gravity spindle.
2—5x4 Whitin Spooler, double rail, 80 spindles each.
3—5x4 Saco-Lowell chain bobbin Conveyor, 80 spindles each.
1—5x4 E. & B. Gravity spindle, no conveyor, 70 spindles.
2—Lowell Section Beam Warpers, creeled for 420 ends.
4—H. & B. Section Beam Warpers, creel for 420 ends.
4—Saco-Lowell Section Beam Warpers, 420 ends with doffing device.
6—Extra adjustable creels for 4½x5 Spools, 420 ends.
10,000—4x5 Spools.
1—4x6 Whitin Spooler, 70 spindles, 4¼″ gauge.
75—Warper Beams 54x24¼.
5—Entwistle Long Chain Beaming Frames.
8—Ball Warping Attachments
2—H. & B. Slashers, 2 cylinder 5x56 and 6x56.
1—C. & M. 44″ Cloth Brusher.
1—C. & M. 44″ Cloth Folder.
1—C. & M. 40″ Brusher and Shearer.
4—C. & M. 40″ Inspecting Machines.
1—Cocker Dyeing Machine, three set rolls, 24″.
1—Boilingout Machine, made by the Textile Finishing Co, three roll sets, three sets squeeze rolls, eight chain capacity.
1—Culver Band machine.
7—H. & B. Twisters 3¼″ gauge, 2¼″ ring, four ply creel, 220 spindles each.
1—H. & B. Twister, 3¼″ gauge 2¼″ ring, four ply creel, 200 spindles.
2—H. & B. Twisters, 4½″ gauge, 3¼″ ring, creel four ply 156 spindles each. The above 1913 model.
1—F. & J. Twister 4½″ gauge, 3½″ ring four ply creel, 128 spindles.
2—Hopedale 3¼″ gauge, 2½″ ring, 136 spindles each.
4—Whitin Twisters, 5″ gauge, 4″ ring equipped for Beam Creel or Spool Creel. 96 spindles each.
18—No. 50 Universal Tube Winders.
7—No. 50 Universal Tube Winders, complete with three end attachments.
5—16 spindle Lowell Cameless Winders.
1—No. 12, 100 spindle, Foster Winder.
8—50 spindle Lindsey Hyde Reels, adjustable swift 54 to 72.
2—50 spindle Tompkin Reels, adjustable swift 52 to 72.
1—50 spindle Whitin 54″ Reel.
3—Double Linker Globe Den Warpers.
2—30″ Balling Machines.
6—Extra Spools creel 432 ends.
1—Boomer & Boschert double screw knuckle joint cloth press.
2—Double screw Daisy Yarn Presses.
1—C. & M. four burner Gas Singeing Machine.

ATLANTA TEXTILE MCHRY. CO., 804 Austell Bldg., Phone Ivy 5706, P. O. Box 1411, Atlanta, Ga.

New and Second Hand

ENGINES

Corliss Automatic and Slide Valve

BOILERS

Pumps, Hoisting Engines, Gas and Gasoline Engines.

MACHINE TOOLS

Lathes, Planers, Shapers, Drill Presses, etc.

WOOD WORKING

Planers, Molders, Band Saws, etc.

ELEC. MACHINERY

Dynamos and Motors

AND SUPPLIES OF ALL KINDS

FRANK TOOMEY, Inc.,

127-31 N. Third St.

Philadelphia, - Pennsylvania

Where the Buyer Benefits

How More Favorable Buying Conditions Are Being Created by Advertising in This Paper at This Time

Through regular advertising, sellers are making buying opportunities, instantly available. By publicly committing themselves in their advertising, they are giving you a strong assurance of faithful performance.

Advertisers are cutting sales costs through the use of advertising as a SALES MACHINE just as they reduce production costs by improved machinery methods.

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Each has subscribed to and is maintaining the highest standards of practice in their editorial and advertising service.

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American Blacksmith
American Exporter
American Funeral Director
American Hatter
American Machinist
American Paint Journal
American Paint and Oil Dealer
American Printer
American School Board Journal
Architectural Record
Automobile Dealer and Repairer
Automobile Journal
Automotive Industries

Bakers Weekly
Bakers Weekly
Boot and Shoe Recorder
Brick and Clay Record
Buildings and Building Management
Building Supply News
Bulletin of Pharmacy

Canadian Grocer
Canadian Railway & Marine World
Candy and Ice Cream
Chemical & Metallurgical Engineering
Clothier and Furnisher
Coal Age
Coal Trade Journal
Concrete
Cotton

Daily Metal Trade
Distribution and Warehousing
Domestic Engineering
Dry Goods Economist
Drygoodsman
Dry Goods Reporter

Electric Railway Journal
Electrical Merchandising
Electrical Record
Electrical World
Embalmer's Monthly
Engineering and Contracting
Engineering and Mining Journal
Engineering News-Record

Factory
Farm Implement News
Farm Machinery—Farm Power
Fire and Water Engineering
Foundry (The)
Furniture Journal
Furniture Manufacturer and Artisan
Furniture Merchants' Trade Journal

Gas Age
Gas Record
Grand Rapids Furniture Record

Haberdasher
Hardware Age

This means ability to make LOWER PRICES to you.

Advertising in a buyer's own paper caters to his convenience; it saves the buyer's time; it helps the buyer weigh and balance rival claims; when the salesman calls, it saves the time of both buyer and salesman by providing the foundation for intelligent judgment.

None but good concerns are admitted to the advertising pages of members of the Associated Business Papers, Inc.

The seller who is building reputation through advertising will jealously guard that reputation in every transaction, beginning with the merit of the merchandise.

Advertising indicates progressiveness, not alone in selling, but throughout the entire business.

By advertising, the seller is publicly displaying his ability and desire to serve you, instead of silently relying upon the necessity of the buyer to produce orders.

You are invited to consult us freely about Business Papers or Business Paper Advertising

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Heating and Ventilating Magazine
Hide and Leather
Hospital Management
Hotel Monthly

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Implement & Tractor Trade Journal
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Iron Age
Iron Trade Review

Lumber
Lumber Trade Journal
Lumber World Review

Manufacturers' Record
Manufacturing Jeweler
Marine Engineering
Marine Review
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Mining and Scientific Press
Modern Hospital
Motor Age
Motorcycle and Bicycle Illustrated
Motor Truck
Motor World

National Builder
National Druggist
National Petroleum News
Nautical Gazette
Northwest Commercial Bulletin
Northwestern Druggist
Nugent's, The Garment Weekly

Oil News
Oil Trade Journal

Plumber and Steam Fitter
Power
Power Boating
Power Farming Dealer
Power Plant Engineering
Price Current—Grain Reporter
Printer's Ink

Railway Age
Railway Electrical Engineer
Railway Maintenance Engineer
Railway Mechanical Engineer
Railway Signal Engineer
Retail Lumberman
Rubber Age and Tire News

Shoe Findings
Shoe and Leather Reporter
Shoe Retailer
SOUTHERN ENGINEER
Southern Hardware & Implemnt Journal
Sporting Goods Dealer
Starchroom Laundry Journal

Tea and Coffee Trade Journal
Textile World Journal

Welding Engineer
Woodworker

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JESSE H. NEAL, Executive Secretary

HEADQUARTERS: 220 West 42nd Street NEW YORK CITY

Buyers' Index

Acetylene Welding Apparatus.
(See Welding Apparatus).

Acetylene Gas.
Commercial Acetylene Supply Co.
Southern Welding & Mach. Co.
Standard Gas Products Co.

Accountants.
(See Auditors and Accountants).

Adding Machines.
Monroe Calculating Mch. Co.

Air Brakes.
Allis-Chalmers Mfg. Co.

Air Washers.
American Blower Co.
Carrier Eng. Corp.
Parks-Cramer Co.
Sturtevant Co., B. F.

Air Conditioning Systems.
(See Humidifying Apparatus).

Albone.
Roessler & Hasslacher Chemical Co.

Alkalies.
(See Dyestuffs and Chemicals).

Aniline Colors.
(See Dystuffs and Chemicals).

Anti-Chlornic.
(See Dyestuffs and Chemicals).

Aprons-Rub.
Ladew & Co., Inc., Edw. R.
Smith & Furbush Machine Co.
Graton & Knight Mfg. Co.

Architects and Engineers.
American City Eng'g Co.
Dowman, George.
Ferguson Co., John W.
Lockwood, Greene & Co.
Robert & Co.
Spiker & Lose.
Sirrine, J. E.
Thompson & Binger, Inc.
Tufts Co., Arthur.

Ash Handling Machinery.
(See Coal Handling Machinery).

Asphalt Slate Shingles.
(See Slate Asphalt Roofing).

Auditors and Accountants.
American Audit Co.
Ernst & Ernst.
Gregory & Gregory, Walter.

Auto Trucks.
(See Trucks—Auto).

Automatic Controllers (Temperature).
(See Temperature Controllers.)

Automatic Loom Attachments.
(See Loom Attachments).

Automatic Feeds for Cotton.
Proctor & Schwartz, Inc.
Saco Lowell Shops.
Sargent's Sons Corp., C. G.
Smith & Furbush Mch. Co.
Whitin Mch. Works.

Automatic Guider (Electric).
Blake Electric Mfg. Co.

Backwashers.
Sargent's Sons Corp., C. G.

Automatic Scales.
(See Scales).

Ball Bearings.
Aldrich Mch. Works.
Campbell Mfg. Co.
Fafnir Bearing Co.
Hyatt Roller Bearing Co.
S K F Industries.
U. S. Ball Bearing Co.

Ball Bearing Housings.
Aldrich Mch. Works.
Fafnir Bearing Co.

Ball Bearing Top Rolls.
Campbell Mfg. Co.

Bale Band Buckles.
(See Box Strapping & Buckles).

Bale and Box Ties.
Lovingood Co.
Regnas Co., J. R.
Signode System, Inc.

Baling Machines.
Crompton & Knowles Loom Wks.
Draper Corporation.
Economy Baler Co.
Galland-Henning Mfg. Co.
Williams & Sons, I. B.
Hulme, J. S.
Saco-Lowell Shops.

Baling Presses.
(See Presses).

Bandages, Tapes, Etc.
American Textile Banding Co.

Bands.
(See Tapes).

Banding Straps and Buckles.
Lovingood Co.
Regnas Co., J. R.
Signode System, Inc.

Bands (Self-Tying).
Campbell Mfg. Co.

Banks.
Atlanta National Bank.
Citizens & Southern Bank.
Irving National Bank.
National Bank of Commerce In New York.
National Shawmut Bank.
Textile Banking Co., Inc.

Barometers (Mercurial).
Tagliabue Mfg. Co., C. J.
Taylor Instrument Co.

Barrels—Fibre.
(See Fibre Products).

Baskets—Mill.
(See Boxes—Mill).

Bath Cabinet—Shower.
Manufacturing Equipment & Engineering Co.
Shower Bath Cabinet Co.

Batteries (Elec.).
(See Storage Batteries).

Beam Dyeing Machines.
Cocker Mchry. & Foundry Co.

Beam Heads (Steel).
Mossberg Co., Frank.

Beaming and Warping Mchry.
(See Warpers and Warping Machinery).

Bearings.
Chicago Pulley & Shafting Co.
Cresson-Morris Co.
Diamond State Fibre Co.
Fafnir Bearing Co.
Hyatt Roller Bearing Co.
Standard Pressed Steel Co.
S K F Industries.
U. S. Ball Bearing Co.

Belting.
American Supply Co.
Augusta Mill Supply Co.
Graton & Knight Mfg. Co.
Ladew & Co., Inc., Edw. R.
Russell Mfg. Co.
U. S. Rubber Co.
Walraven Co.
Williams & Co., I. B.

Belting—Chain Link.
Link-Belt Company.
Morse Chain Co.

Belting—Rope.
(See Rope Transmission).

Belt Conveyors.
Link-Belt Company.
Morse Chain Co.
Portable Machinery Co.

Belt Dressing.
Jos. Dixon Crucible Co.
Graton & Knight Mfg. Co.
Ladew & Co., Inc., Edw. R.
Walraven Co.
Williams & Co., I. B.

Belt Fasteners.
Flexible Steel Lacing Co.

Belt Lacing.
Augusta Mill Supply Co.
Flexible Steel Lacing Co.
Graton & Knight Mfg. Co.
Ladew & Co., Inc., Edw. R.
Walraven Co.

Belt Tighteners.
Link-Belt Company.
Williams & Sons, I. B.

Benches (Park and Playground).
(See Playground Equipment).

Billiard Tables, Etc.
Brunswick-Balke-Collender Co.

Bleacheries.
(See Dyers, Bleachers and Finishers).

Bleaching Kiers.
Butterworth & Sons Co., H. W.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Textile Finishing Machinery Co., The.

Bleaching Machinery.
(See Dyeing, Bleaching and Finishing Machinery).

Bleaching, Finishing and Sizing Materials.
(See Finishing Materials).

Blowers and Blower Systems.
American Blower Co.
Carlisle & Gale Co.
Carrier Eng. Corp.
General Electric Co.
Perkins & Son, B. F.
Sturtevant Co., B. F.
Westinghouse Elec. & Mfg. Co.

Boards—Fibre.
Diamond State Fibre Co.

Boards—Form.
Pearson, Jos. T.

Bobbins.
Draper Corporation.
Greenville Spool & Mfg. Co.
Jordan Mfg. Co.
Shambow Shuttle Co.
Walraven Co.
Whitin Machine Works.

Bobbin Heads.
Diamond State Fibre Co.

Boilers.
International Engineering Works, Inc.
Jones Machinery Corp.
Lombard Iron Works & Supply Co.
Nashville Industrial Corp.
Schofield's Co., J. S.
Toomey, Frank.
Walsh & Weidner Boiler Co.

Boiler Feed Water Purification.
American Water Softener Co.
Borromite Co. of America.
Hulme, J. S.
Permutit Co.
Refinite Co.
Scaife & Sons, Wm. B.

Boiler Room Fittings & Supplies.
Crane Co.
Detroit Stoker Co.
International Engineering Co.
Jenkins Bros.
Lunkenheimer Co.
Nashville Industrial Corp.
Sherwood Mfg. Co.

Boiler Grates and Stokers.
(See Grates and Stokers).

Boiler Graphite.
Jos. Dixon Crucible Co.

Bookkeeping Machines.
Monroe Calculating Mch. Co.

Box Strapping and Tie Buckles.
(See Banding Straps & Buckles).

Boxes—Mill.
Diamond State Fibre Co.
Hightower Box & Tank Co.
Keystone Fibre Co.
Lane & Bros., W. T.
Rogers Fibre Co.
Standard Fibre Co.

Boxes—Packing.
(See Packing Boxes).

Bowling Alleys, Etc.
Brunswick-Balke-Collender Co.

Braid.
(See Tapes).

Brake Linings.
Diamond State Fibre Co.

Brazing.
(See Welding).

Brokers—Cotton.
(See Cotton Dealers & Brokers).

Brokers—Stock.
(See Stocks and Bonds).

Brooms.
(See Brushes.

Brushes—Mill.
Atlanta Brush Co.
Southern Brush & Broom Co.

Brushes—Commutator.
Dixon Crucible Co., Jos.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Buckets and Pails—Mill.
Keystone Fibre Co.
Rogers Fibre Co.
Standard Fibre Co.

Buckets—Elevator and Grab.
Link-Belt Company.

Buckles—Cotton Tie.
(See Box Strapping and Ties).

Building Contractors.
(See Contractors).

Buildings—Portable.
Dowman, George.
Lockwood, Greene & Co.

Building Material.
American Cast Iron Pipe Co.
Anchor Post Iron Works.
Arex Co.
Barrett Co., The.
Birmingham Slag Co.
Detroit Steel Products Co.
Dowman, George.
Dufur & Co.
Kirkpatrick Lumber & Timber Co.
Lockwood, Green & Co,
Seawell, Luke.
Southern Cotton Oil Co.
Southern Cypress Mfg. Asso.

Bungalows.
(See Houses—Ready Built).

Burr Pickers.
Sargent's Sons, C. G.
Smith & Furbush Machine Co.

Bushings.
Diamond State Fibre Co.
Southern Spindle & Flyer Co.
Shambow Shuttle Co.
Walraven Co.

Cabinets.
(See Lockers).

Calculating Machines.
Monroe Calculating Mch. Co.

Calenders.
Butterworth & Sons Co., H. W.
Textile Finishing Machinery Co.

Calender Rolls.
Campbell Mfg. Co.
Butterworth & Sons Co., H. W.
Roy & Son, B. S.
Perkins & Son, Inc., B. F.
Textile Finishing Machinery Co.

Calling System—Inter-Telephone.
Carter Electric Co.

Cans—Roving.
Diamond State Fibre Co.
Keystone Fibre Co.
Rogers Fibre Co.
Standard Fibre Co.

Canvas Lugs.
Augusta Mill Supply Co.

Cars and Trucks—Fibre.
(See Trucks).

Car Unloaders.
Portable Machinery Co.

Carbonizing Machines.
Cocker Mch. & Fdry Co.
Klauder-Weldon Dyeing Mch. Co.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Salem Iron Wks.
Sargent's Sons & Co., C. G.
Textile Finishing Machinery Co., The.
Tolhurst Mch. Wks.

Carding Machinery.
Howard & Bullough.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.
Southern Spindle & Flyer Co.
Whitin Machine Works.

Card Clothing.
Howard & Bullough.
Saco-Lowell Shops.
Southern Spindle & Flyer Co.
Whitin Machine Works.

Card Feeds.
Schofield, Wm. Co.
Smith & Furbush Mach. Co.
Whitin Machine Co.

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Buyers' Index

Acetylene Welding Apparatus.
(See Welding Apparatus).

Acetylene Gas.
Commercial Acetylene Supply Co.
Southern Welding & Mach. Co.
Standard Gas Products Co.

Accountants.
(See Auditors and Accountants).

Adding Machines.
Monroe Calculating Mch. Co.

Air Brakes.
Allis-Chalmers Mfg. Co.

Air Washers.
American Blower Co.
Carrier Eng. Corp.
Parks-Cramer Co.
Sturtevant Co., B. F.

Air Conditioning Systems.
(See Humidifying Apparatus).

Albone.
Roessler & Hasslacher Chemical Co.

Alkalies.
(See Dyestuffs and Chemicals).

Aniline Colors.
(See Dystuffs and Chemicals).

Anti-Chlornie.
(See Dyestuffs and Chemicals).

Aprons-Rub.
Ladew & Co., Inc., Edw. R.
Smith & Furbush Machine Co.
Graton & Knight Mfg. Co.

Architects and Engineers.
American City Eng'g Co.
Dowman, George.
Ferguson Co., John W.
Lockwood, Greene & Co.
Robert & Co.
Spiker & Lose.
Sirrine, J. E.
Thompson & Binger, Inc.
Tufts Co., Arthur.

Ash Handling Machinery.
(See Coal Handling Machinery).

Asphalt Slate Shingles.
(See Slate Asphalt Roofing).

Auditors and Accountants.
American Audit Co.
Ernst & Ernst.
Gregory & Gregory, Walter.

Auto Trucks.
(See Trucks—Auto).

Automatic Controllers (Temperature).
(See Temperature Controllers.)

Automatic Loom Attachments.
(See Loom Attachments).

Automatic Feeds for Cotton.
Proctor & Schwartz, Inc.
Saco Lowell Shops.
Sargent's Sons Corp., C. G.
Smith & Furbush Mch. Co.
Whitin Mch. Works.

Automatic Guider (Electric).
Blake Electric Mfg. Co.

Backwashers.
Sargent's Sons Corp., C. G.

Automatic Scales.
(See Scales).

Ball Bearings.
Aldrich Mch. Works.
Campbell Mfg. Co.
Fafnir Bearing Co.
Hyatt Roller Bearing Co.
S K F Industries.
U. S. Ball Bearing Co.

Ball Bearing Housings.
Aldrich Mch. Works.
Fafnir Bearing Co.

Ball Bearing Top Rolls.
Campbell Mfg. Co.

Bale Band Buckles.
(See Box Strapping & Buckles).

Bale and Box Ties.
Lovingood Co.
Regnas Co., J. R.
Signode System, Inc.

Baling Machines.
Crompton & Knowles Loom Wks.
Draper Corporation.
Economy Baler Co.
Galland-Henning Mfg. Co.
Williams & Sons, I. B.
Hulme, J. S.
Saco-Lowell Shops.

Baling Presses.
(See Presses).

Bandages, Tapes, Etc.
American Textile Banding Co.

Bands.
(See Tapes).

Banding Straps and Buckles.
Lovingood Co.
Regnas Co., J. R.
Signode System, Inc.

Bands (Self-Tying).
Campbell Mfg. Co.

Banks.
Atlanta National Bank.
Citizens & Southern Bank.
Irving National Bank.
National Bank of Commerce In New York.
National Shawmut Bank.
Textile Banking Co., Inc.

Barometers (Mercurial).
Tagliabue Mfg. Co., C. J.
Taylor Instrument Co.

Barrels—Fibre.
(See Fibre Products).

Baskets—Mill.
(See Boxes—Mill).

Bath Cabinet—Shower.
Manufacturing Equipment & Engineering Co.
Shower Bath Cabinet Co.

Batteries (Elec.).
(See Storage Batteries).

Beam Dyeing Machines.
Cocker Mchry. & Foundry Co.

Beam Heads (Steel).
Mossberg Co., Frank.

Beaming and Warping Mchry.
(See Warpers and Warping Machinery).

Bearings.
Chicago Pulley & Shafting Co.
Cresson-Morris Co.
Diamond State Fibre Co.
Fafnir Bearing Co.
Hyatt Roller Bearing Co.
Standard Pressed Steel Co.
S K F Industries.
U. S. Ball Bearing Co.

Belting.
American Supply Co.
Augusta Mill Supply Co.
Graton & Knight Mfg. Co.
Ladew & Co., Inc., Edw. R.
Russell Mfg. Co.
U. S. Rubber Co.
Walraven Co.
Williams & Co., I. B.

Belting—Chain Link.
Link-Belt Company.
Morse Chain Co.

Belting—Rope.
(See Rope Transmission).

Belt Conveyors.
Link-Belt Company.
Morse Chain Co.
Portable Machinery Co.

Belt Dressing.
Jos. Dixon Crucible Co.
Graton & Knight Mfg. Co.
Ladew & Co., Inc., Edw. R.
Walraven Co.
Williams & Co., I. B.

Belt Fasteners.
Flexible Steel Lacing Co.

Belt Lacing.
Augusta Mill Supply Co.
Flexible Steel Lacing Co.
Graton & Knight Mfg. Co.
Ladew & Co., Inc., Edw. R.
Walraven Co.

Belt Tighteners.
Link-Belt Company.
Williams & Sons, I. B.

Benches (Park and Playground).
(See Playground Equipment).

Billiard Tables, Etc.
Brunswick-Balke-Collender Co.

Bleacheries.
(See Dyers, Bleachers and Finishers).

Bleaching Kiers.
Butterworth & Sons Co., H. W.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Textile Finishing Machinery Co., The.

Bleaching Machinery.
(See Dyeing, Bleaching and Finishing Machinery).

Bleaching, Finishing and Sizing Materials.
(See Finishing Materials).

Blowers and Blower Systems.
American Blower Co.
Carlisle & Gale Co.
Carrier Eng. Corp.
General Electric Co.
Perkins & Son, B. F.
Sturtevant Co., B. F.
Westinghouse Elec. & Mfg. Co.

Boards—Fibre.
Diamond State Fibre Co.

Boards—Form.
Pearson, Jos. T.

Bobbins.
Draper Corporation.
Greenville Spool & Mfg. Co.
Jordan Mfg. Co.
Shambow Shuttle Co.
Walraven Co.
Whitin Machine Works.

Bobbin Heads.
Diamond State Fibre Co.

Boilers.
International Engineering Works, Inc.
Jones Machinery Corp.
Lombard Iron Works & Supply Co.
Nashville Industrial Corp.
Schofield's Co., J. S.
Toomey, Frank.
Walsh & Weidner Boiler Co.

Boiler Feed Water Purification.
American Water Softener Co.
Borromite Co. of America.
Hulme, J. S.
Permutit Co.
Refinite Co.
Scaife & Sons, Wm. B.

Boiler Room Fittings & Supplies.
Crane Co.
Detroit Stoker Co.
International Engineering Co.
Jenkins Bros.
Lunkenheimer Co.
Nashville Industrial Corp.
Sherwood Mfg. Co.

Boiler Grates and Stokers.
(See Grates and Stokers).

Boiler Graphite.
Jos. Dixon Crucible Co.

Bookkeeping Machines.
Monroe Calculating Mch. Co.

Box Strapping and Tie Buckles.
(See Banding Straps & Buckles).

Boxes—Mill.
Diamond State Fibre Co.
Hightower Box & Tank Co.
Keystone Fibre Co.
Lane & Bros., W. T.
Rogers Fibre Co.
Standard Fibre Co.

Boxes—Packing.
(See Packing Boxes).

Bowling Alleys, Etc.
Brunswick-Balke-Collender Co.

Braid.
(See Tapes).

Brake Linings.
Diamond State Fibre Co.

Brazing.
(See Welding).

Brokers—Cotton.
(See Cotton Dealers & Brokers).

Brokers—Stock.
(See Stocks and Bonds).

Brooms.
(See Brushes.

Brushes—Mill.
Atlanta Brush Co.
Southern Brush & Broom Co.

Brushes—Commutator.
Dixon Crucible Co., Jos.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Buckets and Pails—Mill.
Keystone Fibre Co.
Rogers Fibre Co.
Standard Fibre Co.

Buckets—Elevator and Grab.
Link-Belt Company.

Buckles—Cotton Tie.
(See Box Strapping and Ties).

Building Contractors.
(See Contractors).

Buildings—Portable.
Dowman, George.
Lockwood, Greene & Co.

Building Material.
American Cast Iron Pipe Co.
Anchor Post Iron Works.
Arex Co.
Barrett Co., The.
Birmingham Slag Co.
Detroit Steel Products Co.
Dowman, George.
Dufur & Co.
Kirkpatrick Lumber & Timber Co.
Lockwood, Green & Co.
Seawell, Luke.
Southern Cotton Oil Co.
Southern Cypress Mfg. Asso.

Bungalows.
(See Houses—Ready Built).

Burr Pickers.
Sargent's Sons, C. G.
Smith & Furbush Machine Co.

Bushings.
Diamond State Fibre Co.
Southern Spindle & Flyer Co.
Shambow Shuttle Co.
Walraven Co.

Cabinets.
(See Lockers).

Calculating Machines.
Monroe Calculating Mch. Co.

Calenders.
Butterworth & Sons Co., H. W.
Textile Finishing Machinery Co.

Calender Rolls.
Campbell Mfg. Co.
Butterworth & Sons Co., H. W.
Roy & Son, B. S.
Perkins & Son, Inc., B. F.
Textile Finishing Machinery Co.

Calling System—Inter-Telephone.
Carter Electric Co.

Cans—Roving.
Diamond State Fibre Co.
Keystone Fibre Co.
Rogers Fibre Co.
Standard Fibre Co.

Canvas Lugs.
Augusta Mill Supply Co.

Cars and Trucks—Fibre.
(See Trucks).

Car Unloaders.
Portable Machinery Co.

Carbonizing Machines.
Cocker Mch. & Fdry Co.
Klauder-Weldon Dyeing Mch. Co.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Salem Iron Wks.
Sargent's Sons & Co., C. G.
Textile Finishing Machinery Co., The.
Tolhurst Mch. Wks.

Carding Machinery.
Howard & Bullough.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.
Southern Spindle & Flyer Co.
Whitin Machine Works.

Card Clothing.
Howard & Bullough.
Saco-Lowell Shops.
Southern Spindle & Flyer Co.
Whitin Machine Works.

Card Feeds.
Schofield, Wm. Co.
Smith & Furbush Mach. Co.
Whitin Machine Co.

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BUYERS' INDEX—Continued.

Card Grinding Machinery.
Roy & Son Co., B. S.
Smith & Furbush Mach. Co.
Whitin Machine Works.

Carpet Machinery.
Butterworth, H. W., & Sons Co.
Crompton & Knowles Loom Wks.
Proctor & Schwartz, Inc.
Schofield, Wm. Co.
Smith & Furbush Mach. Co.
Textile Finishing Machinery Co., The.

Carrier Aprons.
(See Aprons).

Cases—Wooden.
(See Boxes).

Casement Window Hardware.
Dowman, George.
Richards-Wilcox Mfg. Co.

Castings.
American Cast Iron Pipe Co.
Cresson-Morris Co.
Lombard Foundry & Mch. Co.
Walsh & Weidner Boiler Co.

Cast Iron Columns.
American Cast Iron Pipe Co.

Caustic Soda.
(See Bleaching Materials).

Cement Machinery.
Allis-Chalmers Mfg. Co.

Cement Reinforcement.
Birmingham Slag Co.

Cement and Brick Coating.
Cooledge & Sons, F. J.
Dixon Crucible Co., Jos.
Peaslee-Gaulbert Co., Inc.
Patterson-Sargent Co.
Tropical Paint Co.
Wadsworth Howland & Co., Inc.

Centrifugals.
Cresson-Morris Co.
Tolhurst Mch. Wks.

Chain Drives.
(See Belting—Chain Link).

Chain—Block, Bicycle Auto, Engine, Agricultural, Etc.)
Morse Chain Co.

Chairs and Stools.
Manufacturing Equipment & Engineering Co.
Pick & Sons, Albert.
Reischmann Co.
Wright Co.

Chemicals.
(See Dyestuffs and Chemicals).

Chlorine Gas.
Electro Bleaching Gas Co.

Cleaning Machine—Suction.
United Electric Co.

Clocks—Hank, Etc.
(See Counters).

Clocks—Time.
Eco Clock Co.

Clocks—Watchman.
Eco Clock Co.
Chicago Watchman Clock Co.
Dixie Electric Equip. Co.

Closets—Water.
(See Toilets).

Cloth Cutters.
Firsching, J. A.
Wildman Mfg. Co.

Cloth Guider (Electric).
Blake Electric Mfg. Co.

Cloth Room Machinery.
Butterworth, H. W., & Sons Co.
Firsching, J. A.
Saco-Lowell Shops.
Scott & Co., Henry L.
Textile Finishing Machinery Co.
Wildman Mfg. Co.

Cloth Shrinking Machinery.
Reliance Machine Works.
Tolhurst Mch. Wks.

Cloth Testers.
Scott & Co., Henry L.

Cloth Winders.
(See Winders).

Clutches—Friction.
Carlyle-Johnson Machine Co.
Cresson-Morris Co.
Dodge Sales & Eng. Co.
Link-Belt Company.

Clutch Linings.
Diamond State Fibre Co.

Coal.
U. S. Fuel Corp.

Coal & Ash Handling Machinery.
Link-Belt Company.
Portable Machinery Co.

Coal Tar Disinfectants.
(See Disinfectants).

Cocks.
(See Valves).

Color Pails.
(See Buckets—Mill).

Color Testers.
Atlas Electric Devices Co.

Comb Aprons.
(See Aprons).

Commission Merchants & Dealers.
(See Cotton Cloth Commission Merchants).

Compressors—Air.
Allis-Chalmers Mfg. Co.
General Electric Co.
Jones Mchry. Corp.
Seeger Machine Tool Co.
Walraven Co., The.

Concrete Reinforcement.
Birmingham Slag Co.

Condensers.
Allis-Chalmers Mfg. Co.
Seeger Machine Tool Co.

Conduits.
Diamond State Fibre Co.

Condulets.
Crouse-Hinds Co.

Connectors—Frankel Solderless.
Westinghouse Elec. & Mfg. Co.

Consulting Engineers.
(See Architects and Engineers).

Contractors and Engineers—Building.
Aberthaw Construction Co.
American City Eng'g Co.
Dowman, George.
Ferguson Co., Jno. W.
Fonda Organization, The E. A.
Goode, R. L.
Gude & Co.
Robbins & Sons, J. E.
Spiker & Lose.
Thompson & Binger.
Tufts Co., Arthur.

Contractors—Electrical.
(See Electrical Engineers.

Contractors—Painting.
Marshall Co., H. Newton.

Controlling Instruments—Temperature.
General Electric Co.
Powers Regulator Co.
Tagliabue Mfg. Co., C. J.
Taylor Instrument Co.

Conveyors—Belt.
(See Belt Conveyors).

Conveying Machinery.
American Supply Co.
Collins, J. D.
Cresson-Morris Co.
Hulme, J. S.
Link-Belt Co
Morse Chain Co.
Phila. Drying Machinery Co.
Proctor & Schwartz, Inc.
Portable Machinery Co.
Richards-Wilcox Mfg. Co.
Schofield, Wm. Co.
Standard Conveyor Co.
Seeger Machine Tool Co.
Walraven Co.

Conveyors—Portable.
Portable Machinery Co.

Coolers.
(See Humidifying Apparatus.)

Coolers—Water.
(See Water Coolers).

Cooling Towers.
(See Tanks and Towers).

Copper Stamps and Stencils.
(See Stamps, Stencils, Etc.)

Cordage Machinery.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.
Textile Finishing Machinery Co., The.

Cotton Yarn and Cloth Commission Merchants and Dealers.
Carver-Beaver Yarn Co., Inc.
Fawcett, Hughes.
Florsheim, H. A.
Hunter Mfg. & Comm. Co.
Iselin & Co., Wm.
Southern Cotton Yarn Co.
Weimar Bros.
Woodward Baldwin & Co.

Cotton Dealers and Brokers.
Beer, H. & B.
Cutts, E. A.

Cotton Mill Machinery and Supplies.
Augusta Mill Supply Co.
Barber-Colman Co.
Blake Electric Mfg. Co.
Butterworth & Sons, H. W.
Cocker Mach. & Foundry Co.
Crompton & Knowles Loom Wks.
Draper Corporation.
Firsching, J. A.
Fletcher Works.
Greist Mfg. Co.
Greenville Spool & Mfg. Co.
Howard & Bullough.
Jones Mchry. Corp.
Mason Machine Works.
Phila. Drying Mchry. Co.
Proctor & Schwartz, Inc.
Sargent's Sons Corp., C. G.
Saco-Lowell Shops.
Schaum & Uhlinger.
Schofield Co., Wm.
Shambow Shuttle Co.
Slaughter Mchry. Co., G. G.
Smith & Furbush Mach. Co.
Southern Bending Co.
Stafford Co.
Steel Heddle Mfg. Co.
Terrell Machine Co.
Textile Fininshing Machinery Co.
Tolhurst Mch. Wks.
Universal Winding Co.
Unchurch, C. L.
Walraven Co.
Warp Compressing Mch. Co.
Whitin Machine Works.
Whitinsville Spinning Ring Co.

Cotton Tape Loom.
Fletcher Works.
Schaum & Uhlinger.

Cotton Yarn Mills.
(See Yarn Manufacturers).

Counters—Revolution, Hank, Pick, Etc.
Precision Machine Co.

Counters—Restaurant.
(See Restaurant Equipment.)

Coupling—Shaft.
Chicago Pulley & Shafting Co.
Cresson-Morris Co.

Covers—Rollers.
Diamond State Fibre Co.

Cranes.
(See Hoists).

Crayons.
Dixon Crucible Co., Jos.
Lovingood Co.
Lowell Crayon Co.
Regnas & Co., J. R.

Creosote Oil and Creosoting.
Gulf States Creosoting Co.

Crushing Machinery.
Allis-Chalmers Mfg. Co.

Cutters—Cloth.
(See Cloth Cutters).

Cypress Lumber.
Southern Cypress Mfg. Asso.

Cutters—Thread.
(See Thread Cutters).

Dairy Supplies.
Hackney Bros. Co.

Deep Wells and Supplies.
Hughes Specialty Well Drilling Co.

Dehumidifying.
Sturtevant Co., B. F.

Delivery Cases.
(See Boxes—Packing).

Dial Scales.
(See Scales).

Dies—Steel.
(See Stamps, Stencils, Etc.).

Discs—Fibre.
Diamond State Fibre Co.

Dishes and Glassware.
Chattanooga Queensware Co.
Pick & Sons, Albert.

Disinfectants.
Barrett Co., The
Sanitas Co.

Dobby Chains.
Crompton & Knowles Loom Wks.
Whitin Machine Works.

Doffing Boxes—Mill.
(See Boxes—Mill).

Doffing Cars.
(See Cars).

Door Closers and Checks.
Richards-Wilcox Mfg. Co.

Door Hangers.
Dowman, George.
Richards-Wilcox Mfg. Co.

Door Mats—Steel.
Lovingood Co.
Regnas & Co., J. R.

Draft Gauges.
(See Gauges—Draft).

Drawing Frames.
Howard & Bullough.
Saco-Lowell Shops.
Whitin Machine Works.

Drills—Electric.
(See Electric Machinery).

Drinking Fountains.
(See Fountains—Drinking).

Drop Wires.
Greist Mfg. Co.
Steel Heddle Mfg. Co.

Drying Apparatus.
American Blower Co.
Sturtevant Co., B. F.

Drying Forms—Hosiery.
Pearson, Jos. T.

Drying Machinery.
American Laundry Mchry. Co.
Butterworth, H. W., & Sons Co.
Proctor & Schwartz, Inc.
Sargent's Sons Corp., C. G.
Textile Finishing Machinery Co., The.
Tolhurst Machine Works.

Dust Collectors.
(See Blowers and Blowing Systems).

Dusting Machinery.
Schofield Co., Wm.
Smith & Furbush Mach. Co.

Dyers, Bleachers and Finishers.
American Processing Co.
King, Habersham.

Dyeing, Bleaching, Finishing and Printing Machinery.
American Laundry Mchry. Co.
Atlas Electric Devices Co.
Butterworth & Sons Co., H. W.
Cocker Mch. & Foundry Co.
Electro Bleaching Gas Co.
Firsching, J. A.
Fletcher Works.
Hulme, J. S.
Klauder-Weldon Dyeing Mch. Co.
Permutit Co.
Phila. Drying Machinery Co.
Proctor & Schwartz, Inc.
Refinite Co.
Reliance Machine Works.
Rome Mch. & Fdry. Co.
Salem Iron Wks.
Schaum & Uhlinger.
Textile Finishing Machinery Co. The.
Tolhurst Machine Works.

Dye Sticks.
Phila. Drying Machinery Co.

Dyestuffs and Chemicals.
Althouse Chemical Co.
Arabol Mfg. Co.
Arnold, Hoffman & Co.
Atlantic Dyestuff Co.
Barrett Co.
Borne, Scrymser Co.
Bosson & Lane.
Du Pont de Nemours & So., E. I.
Electro Bleaching Gas Co.
Grasselli Chemical Co.
Kali Mfg. Co.
Klipstein & Co., A.
Lewis, John D.
Metz & Co., H. A.
Moore Oil Refining Co.
National Aniline & Chemical Co.
Newport Chemical Works, Inc.
Roessler & Hasslacher Chemical Co.
Sonneborn Sons, Inc., L.
Southern Distributing Co.
Surpass Chemical Co.
United Chemical Products Corp.
Wolf & Co., Jacques.
Zavon Co., Inc.

Electric Cleaning System—Suction.
United Electric Co.

Electric Conduit & Fittings.
National Metal Molding Co.

Ejectors.
Sherwood Mfg. Co.

Electric Dynamos and Motors.
See Motors and Generators).

Electric Fans.
(See Fans—Electric).

Electric Lamps.
(See Lamps).

Electric Lamp Guards.
Flexible Steel Lacing Co.

Electrical Engineers and Contractors.
Dixie Electrical Equipment Co.
Huntington & Guerry, Inc.

Electrical Machinery and Supplies.
Allis-Chalmers Mfg. Co.
Atlas Electric Devices Co.
Benjamin Electric Co.
Blake Electric Mfg. Co.

How Do You Check the Quality of Your Disinfectant?

When you purchase any commodity you expect a certain definite value for the money you pay. Usually you have a means of determining whether or not you have received the value expected.

Is this true in your purchase of disinfectants? If you may buy your disinfectants on a GUARANTEED coefficient basis, undoubtedly it is—otherwise probably not.

Consider these four facts:—

First—Disinfectants are employed for the destruction of germ life.

Second—Their relative efficiency therefore lies in their germ killing power.

Third—They vary in germ killing power to a remarkable degree.

Fourth—It is impossible by appearance, odor, feel, or even chemical analysis to determine their efficiency.

Then you will realize the importance of knowing how you can distinguish the good product from the inferior. Sound buyers and executives who recognize the relation between the sanitary conditions of their plants and production, are giving more and more thought to the quality of the disinfectant they purchase.

Every user is entitled to know and should know about disinfectants in general; their uses and limitations and how their relative value is determined.

DISINFECTANT FACTS FOR THE PRACTICAL BUYER, a booklet for limited distribution, may tell you some interesting things about disinfectants that are not commonly known.

There is a copy of DISINFECTANT FACTS waiting for you at our office. If you will tell us how to address it, we will send it along post-haste.

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Cooper-Hewitt Elec. Co.
Crouse-Hinds Co.
Cutter Works, George.
Dixie Electrical Equipment Co.
Economy Fuse & Fuse Co.
General Electric Co.
Hulme, J. S.
Jones Mchry. Corp.
National Metal Molding Co.
Seeger Machine Tool Co.
Slaughter Mchry. Co., G. G.
United Electric Co.
Walraven Co., The.
Walsh & Weidner Boiler Co.
Westinghouse Elec. & Mfg. Co.

Electrical Repairing—all kinds.
Dixie Electrical Equipment Co.

Electric Tractors and Trucks.
(See Tractors & Trucks—Elec).

Elevators—Portable.
Collins, J. D.
Lovingood Co.

Elevators.
Link-Belt Company.
Seeger Machine Tool Co.
Standard Conveyor Co.

Enamel—Mill White.
(See Paint).

Engineers—Mill.
(See Architects).

Engines—Oil, Gas and Gasoline.
Seeger Machine Tool Co.

Engines—Steam.
Allis-Chalmers Mfg. Co.
Jones Mchry. Corp.
Lombard Iron Works & Supply Co.
Nashville Industrial Corp.
Schofield's Sons Co., J. S.
Toomey, Frank.
Walsh & Weidner Boiler Co.

Engine Room Appliances and Supplies.
Crane Co.
Cutter Works, George.
Graton & Knight Mfg. Co.
Jenkins Bros.
Lunkenheimer Co.
Nashville Industrial Corp.
Slaughter Mchry. Co., G. G.
Sherwood Mfg. Co.
Walraven Co.
Westinghouse Electric & Mfg. Co.

Exporters—Cotton.
(See Brokers).

Extractors—Hydro.
American Laundry Mchry. Co.
Fletcher Works.
Schaum & Uhlinger.
Tolhurst Machine Works.

Fans—Electric.
Allis-Chalmers Mfg. Co.
American Blower Co.
Benjamin Electric Co.
Carter Electric Co.
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Fans—Conveying, Power and Exhaust.
(See Blowers and Blowing Systems).

Fasteners—Belt.
(See Belt Fasteners).

Feed Water Purifiers.
(See Boiler Feed Water Purification).

Felting Machinery.
Smith & Furbush Mch. Co.

Fence—Steel and Iron.
American Cast Iron Pipe Co.
Anchor Post Iron Works.
Cyclone Fence Co.
Dowman, George.

Fibre Products.
Diamond State Fibre Co.
Keystone Fibre Co.
Rogers Fibre Co.
Standard Fibre Co.

Filters—Water.
American Water Softener Co.
Borromite Co. of America.
Hulme, J. S.
Permutit Co.
Refinite Co.
Scaife & Sons Co., Wm. B.

Filters—Oil Removal.
Permutit Co.
Sherwood Mfg. Co.

Filters—Sand.
Permutit Co.

Finishing.
(See Dyers, Bleachers and Finishers).

Finishing, Bleaching and Sizing Materials.
Althouse Chemical Co.
Atlantic Dyestuff Co.
Arabol Mfg. Co.
Arnold, Hoffman & Co.
Barrett Co.
Borne, Scrymser Co.
Bosson & Lane.
Corn Products Refining Co.
Dobbins Soap Mfg. Co.
Du Pont de Nemours & Co., E. I.
Electric Smelting & Alum. Co.
Electro Bleaching Gas Co.
Grasselli Chemical Co.
Kali Mfg. Co.
Keever Starch Co.
Klipstein & Co., A.
National Aniline & Chemical Co.
Newport Chemical Works.
Metz & Co., H. A.
Moore Oil Refining Co.
Roessler & Hasslacher Co.
Sonneborn Sons, Inc., L.
Southern Distributing Co.
United Chemical Products Corp.
Warren Soap Mfg. Co.
Wolf & Co., Jacques.
Zavon Co., Inc.

Fire Alarm Apparatus.
Dixie Electric Equip. Co.

Fire Doors and Hardware.
Dowman, George.
Richards-Wilcox Mfg. Co.

Fire Hose.
(See Hose—Fire).

Fire Protecting Paint.
(See Paint).

First Aid Room Equipment.
(See Hospital Equipment).

Flexible Couplings.
Cresson-Morris Co.

Flood Lights—Electric.
Crouse-Hinds Co.
General Electric Co.

Flooring—Hardwood.
Kirkpatrick Lumber & Tim. Co.
Southern Cypress Mfg. Co.

Floor Scrubbing Machine.
American Scrubbing Equip. Co.

Floor Sweeps.
See Brushes.

Fluted Rolls.
Campbell Mfg. Co.
Howard & Bullough.
Perkins & Son, B. F.
Saco-Lowell Shops.
Schofield & Sons, J. S.
Smith & Furbush Mach. Co.
Southern Spindle & Flyer Co.
Whitin Machine Works.

Flyers.
Howard & Bullough.
Saco-Lowell Shops.
Southern Spindle & Flyer Co.
Whitin Machine Works.

Founders.
Cresson-Morris Co.
Lombard Fdry. & Mch. Works.

Fountains—Drinking.
Crane Co.
Manufacturing Equipment & Engineering Co.
Puro Sanitary Drinking Fountain Co.
Rundle-Spence Mfg. Co.
Southern States Supply Co.

Friction Clutches.
(See Clutches—Friction).

Fuel.
(See Coal).

Fuses.
(See Elec. Mchy. and Supplies).

Garage Doors and Door Hardware.
Dowman, George.
Richards-Wilcox Mfg. Co.

Garnett Machines.
Roy & Son Co., B. S.
Smith & Furbush Mach. Co.

Gas Engines.
(See Engines—Gas).

Gaskets.
Diamond State Fibre Co.
Graton & Knight Mfg. Co.

Gauge Cocks.
Lunkenheimer Co.
Sherwood Mfg. Co.

Gauges—Draft.
Tagliabue Mfg. Co., C. J.
Taylor Instrument Co.

Gauges—Mercury Column Vacuum.
Tagliabue Mfg. Co., C. J.
Taylor Instrument Co.

Gauge—Oil.
Lunkenheimer Co.

Gauges—Pressure.
Tagliabue Mfg. Co., C. J.

Gauges—Recording.
Tagliabue Mfg. Co., C. J.
Taylor Instrument Co.

Gauges—Water.
Lunkenheimer Co.

Gears—Silent.
Diamond State Fibre Co.
General Electric Co.
Link-Belt Company.
Morse Chain Co.

Gear Cutting and Cutters.
Cresson-Morris Co.
Southern Welding & Machine Co.
Whitin Machine Co., D. E.

Gear Pullers.
General Electric Co.
Greb Co., Inc.

Generators—Electric.
(See Motors and Generators).

Glassware and Dishes.
(See Dishes).

Governors—Pressure.
Tagliabue Mfg. Co., C. J.

Governors—Pump.
General Electric Co.
Tagliabue Mfg. Co., C. J.

Graphite Products.
Dixon Crucible Co., Jos.

Grates—Boiler.
Detroit Stoker Co.
International Eng. Works.
Lombard Fdry. & Mch. Co.

Grates—Mechanical.
(See Stokers).

Grease.
(See Lubricants).

Grease Cups.
(See Lubricators).

Green Houses.
Hulme, J. S.

Grindstones.
Richards-Wilcox Mfg. Co.

Grinders—Card, Cylinder, Roll, Napper and Garnet.
(See Card Grinding Machinery).

Guards—Electric Lamp.
Flexible Steel Lacing Co.

Guides—Thread.
Mitchell-Bissell Co.
Palmer Co., E. I.

Guider (Cloth-Electric.)
Blake Electric Mfg. Co.

Gums.
(See Finishing and Sizing Materials).

Guy Anchors.
Crouse-Hinds Co.

Gymnasium Apparatus.
Medart Mfg. Co., Fred.

Hangers.
(See Shafting and Hangers).

Harness—Loom.
American Supply Co.
Crompton & Knowles Loom Wks.
Emmons Loom Harness Co.
Greist Mfg. Co.
Garland Mfg. Co.
Southern Bending Co.

Heads—Bobbin and Spool.
Diamond State Fibre Co.

Heating and Ventilating Apparatus.
(See Ventilating Apparatus).

Heddles.
Crompton & Knowles Loom Wks.
Draper Corporation.
Steel Heddle Mfg. Co.

Heddle Frames.
Crompton & Knowles Loom Wks.
Steel Heddle Mfg. Co.

Hoists.
Curtis Pneumatic Mchry. Co.
Hulme, J. S.
Link-Belt Company.
Morse Chain Co.
Seeger Machine Tool Co.
Walraven Co.

Hose—Fire.
Collins, J. D.
U. S. Rubber Co.

Hosiery Dyeing Machinery.
Cocker Mach. & Fdry. Co.
Rome Mach. & Fdry. Co.

Hosiery Finishing Boards.
(See Boards).

Hosiery Forms.
(See Drying Forms).

Hosiery Yarns.
(See Yarn Manufacturers).

Hospital Equipment.
Thomas Co., F. H.
Wright Co.

Hotels.
Sinton.

Houses—Ready-Made.
Dowman, George.
Tuxbury Lumber Co.

Humidifying Apparatus.
American Blower Co.
Carrier Eng. Corp.
Parks-Cramer Co.
Sturtevant Co., B. F.

Humidity Indicating Instruments.
Powers Regulator Co.
Tagliabue Mfg. Co., C. J.
Taylor Instrument Co.

Hydraulic Turbines.
(See Turbines—Steam).

Hydro Extractors.
(See Extractors).

Hydrometers.
Taylor Instrument Co.

Hygrometers.
Taylor Instrument Co.

Hygrodeiks.
Taylor Instrument Co.

Indicating and Recording Instruments and Thermometers.
General Electric Co.
Powers Regulator Co.
Taylor Instrument Co.
Tagliabue Mfg. Co., C. J.

Indigo.
(See Dyestuffs and Chemicals).

Industrial Relationship Service.
Sherman Service, Inc.

Injectors.
Lunkenheimer Co.
Sherwood Mfg. Co.

Insulation—Vulcanized Fibre.
Diamond State Fibre Co.

Insurance.
American Mutual Liability Ins. Co.
Miller Indemnity Underwriters.

Ink—Stencil and Marking.
Atlanta Stamp & Stencil Works.
Bradley Mfg. Co., A. J.
Lovingood Co.
Regnas & Co., J. R.

Iron Work—Ornamental.
American Cast Iron Pipe Co.
Anchor Post Iron Works.
Cyclone Fence Co.
Dowman, George.
Dufur & Co.
Lombard Iron Works & Supply Co.

Jacks.
Paulus, Chas. B.

Jacquards.
Crompton & Knowles Loom Wks.

Jerker Straps.
Augusta Mill Supply Co.

Jute Bagging Machine.
Smith & Furbush Machine Co.

Kettles—Size.
(See Size Kettles).

Kettles—Soda.
Lombard Iron Works & Sup. Co.

Kiers.
(See Bleacher Kiers).

Knit Goods Specialties.
Knit Goods Specialty Co.

Knit Goods.
(See Cotton Cloth Commission Merchants and Dealers).

Knit Goods Washers.
(See Washers—Cloth).

Knitting Machinery and Supplies.
Brinton Co., H.
General Machine Works.
Hemphill Mfg. Co.
Paulus, Chas. B.
Scott & Williams.
Wildman Mfg. Co.

Laboratory Instruments and Thermometers.
Tagliabue Mfg. Co., C. J.

Lacing—Belt.
(See Belt Lacing).

Lamps—Incandescent and Arc.
Benjamin Electric Co.
Carter Electric Co.
Cooper Hewitt Electric Co.
Crouse-Hinds Co.
Cutter Works, George.
General Electric Co.
Jones Mchry. Corp.
Walraven Co.
Westinghouse Elec. & Mfg. Co.
Westinghouse Lamp Co.

Lamp Guards—Key Locking.
Flexible Steel Lacing Co.

Lamp Reflectors.
Benjamin Electric Co.
Carter Electric Co.
Cooper Hewitt Electric Co.
Crouse-Hinds Co.
Cutter Works, George.
Westinghouse Elec. & Mfg. Co.

Landscape Architects.
(See Village Architects).

Lappers.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.
Whitin Machine Works.

Latch Needles.
Paulus, Chas. B.

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Schaum & Uhlinger.
Tolhurst Machine Works.

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Crane Co.
Manufacturing Equipment & Engineering Co.
Vogel Co., Jos. A.

Lawn Mowers.
Ideal Lawn Mower Co.

Leather Belting.
(See Belting).

Leather Specialties.
American Supply Co.
Graton & Knight Mfg. Co.
Ladew & Co., Inc., Edw. R.
Williams & Sons, I. B.

Lights—Flood.
Crouse-Hinds Co.
Cutter Works, George.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Linen Yarns.
(See Yarns—Linen).

Link Belting.
(See Belting—Link).

Linters.
(See Waste Dealers).

Liquid Chlorine.
(See Chlorine).

Loaders—Wagon and Truck.
Link-Belt Company.
Portable Machinery Co.

Locks and Latches.
Richards-Wilcox Mfg. Co.

Lockers—Metal.
Collins, J. D.
Dowman, George.
Medart Mfg. Co., Fred.

Logwood Extract.
(See Dyestuffs and Chemicals).

Looms.
Augusta Mill Supply Co.
Crompton & Knowles Loom Wks.
Draper Corporation.
Fletcher Works.
Jones Mchry. Corp.
Mason Machine Works.
Saco-Lowell Shops.
Schaum & Uhlinger.
Schofield, Wm. & Co.
Slaughter Mchry. Co., G. G.
Stafford Co., The.
Upchurch, C. L.

Loom Attachments—Automatic.
Draper Corporation.

Loom Harness.
(See Harness).

Lubricants.
Dixon Crucible Co., Jos.
N. Y. & N. J. Lubricant Co.
Swan & Finch Co.
Texas Co.

Lubricators.
Lunkenheimer Co.
N. Y. & N. J. Lubricant Co.
Sherwood Mfg. Co.

Lug Straps.
(See Straps—Lug).

Lumber.
Kirkpatrick Lumber & Timber Co.
Southern Cypress Mfg. Asso.
Tuxbury Lumber Co., A. C.

Lunch Room Equipment.
(See Restaurant).

Machine Tools.
(See Tools).

Machinists.
Cresson-Morris Co.

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Kaumagraph Co.

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Atlanta Stamp & Stencil Wks.
Bradley Mfg. Co., A. J.
Lovingood Co.
Regnas & Co., J. R.

Mercerized Yarns.
(See Yarn Manufacturers).

Mercerizing Machinery.
Butterworth, H. W. & Sons Co.
Textile Finishing Machinery Co.

Metal Ceilings, Etc.
Dowman, George.
Lupton's Sons Co., David.

Metals—Perforated.
(See Screens and Sieves).

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Dowman, George.
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Carter Electric Co.
General Electric Co.
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Westinghouse Elec. & Mfg. Co.

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Taylor Instrument Co.

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(See Boxes—Mill).

Mill Engineer.
(See Architects and Engineers).

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(See Villages).

Mill Supplies—Miscellaneous.
(See Supplies—Mill).

Mill White Paint.
(See Paint).

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Hulme, J. S.
Jones Mchry. Corp.
Nashville Industrial Corp.
Seeger Machine Tool Co.
Walraven Co., The.
Westinghouse Elec. & Mfg. Co.

Moving Picture Mch. & Supplies.
(See Theatre Equipment).

Nails—Cement Coated.
Lovingood Co.
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Nappers.
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Oils—Finishing.
(See Finishing and Sizing Materials).

Oils—Lubricating.
(See Lubricants).

Oil Cups.
(See Lubricators).

Oil Paper.
Bradley Mfg. Co., A. J.

Oil Testing Instruments.
Tagliabue Mfg. Co., C. J.

Oiling Devices.
(See Lubricators).

Openers for Cotton, Wool, Waste, Etc.
Saco-Lowell Shops.
Schofield Co., Wm.
Smith & Furbush Mach. Co.
Whitin Machine Works.

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Stieff, Inc., Chas. M.

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(See Switchboards).

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(See Screens and Sieves).

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Economy Baler Co.
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Textile Finishing Machinery Co., The.

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Walraven Co., The.

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Williams & Sons, I. B.

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(See Valve Discs).

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Southern Railway Systems.

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(See Fibre Products).

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Recorders—Pressure.
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Emmons Loom Harness Co.
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Draper Corporation.
Saco-Lowell Shops.
Schofield Co., Wm.
Whitin Machine Works.

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(See Lamp Reflectors).

Regulators—Condensate.
Tagliabue Mfg. Co., C. J.

Regulators—Liquid Level.
General Electric Co.
Tagliabue Mfg. Co., C. J.

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Southern States Supply Co.

Regulators—Pressure.
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Taylor Instrument Co.

Regulators—Temperature.
(See Temperature Controllers).

Regulators—Time.
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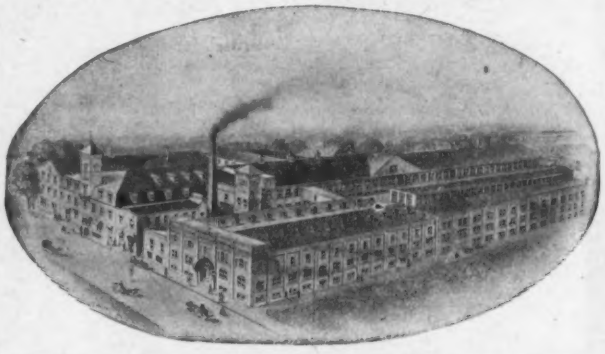

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Rolls—Top.
Campbell Mfg. Co.

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Barrett Co., The.
Cooledge & Sons, F. J.
Cortright Metal Roofing Co.
Dowman, George.
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Walraven Co.

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Patterson-Sargent Co.
Peaslee-Gaulbert Co., Inc.
Southern Cotton Oil Co.
Tropical Paint Co.
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Rope—Transmission.
Cresson-Morris Co.
Dodge Sales & Eng. Co.
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Walraven Co.

Roving Cans and Trucks.
(See Cans—Roving).

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(See Stamps, Stencils, Etc).

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Hackney Bros. Co.
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Sanitas Co.
United Electric Co.
Vogel Co., Jos. A.

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Detroit Steel Products Co.
Dowman, George.
Lupton's Sons Co., David.

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American Kron Scale Co.
Lovingood Co.
Torsion Balance Co.

Scale Preventer—Boiler.
(See Boiler Feed Water Purification).

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Link-Belt Company.

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(See Washers (Cloth)

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American Scrubbing Mch. Co.

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Nashville Industrial Corp.
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Upchurch, C. L.
Walraven Co.

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Merrow Machine Co., The.
Textile Finishing Machinery Co.
Willcox & Gibbs Sewing Machine Co.

Shades—Electric Lamp.
(See Reflectors).

Shafting and Hangers.
Augusta Mill Supply Co.
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Cresson-Morris Co.
Dodge Sales & Eng. Co.,
Fafnir Bearing Co.
Link-Belt Co.
Seeger Machine Tool Co.
S K F Industries.
Standard Pressed Steel Co.
Walraven Co., The.

Shears.
Roy & Sons Co., B. S.

Shelving—Sectional Steel.
Collins, J. D.
Dowman, George.
Hyatt Roller Bearing Co.
Lupton's Sons Co., David.
Medart Mfg. Co., Fred.

Shingles—Asphalt.
Barrett Co.

Shingles—Metal.
Cortright Metal Roofing Co.
Dowman, George.

Shingles—Wood.
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Southern Cypress Mfg. Asso.

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Collins, J. D.
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Hightower Box & Tank Co.
Hulme, J. S.
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Lane & Bro., W. T.
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Regnas & Co., J. R.
Rogers Fibre Co.
Standard Fibre Co.
Seeger Machine Tool Co.
Signode System, Inc.
Torsion Balance Co.
Walraven Co., The.
Walke Box Co., Inc.
Wall & Son, C. M.

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Crane Co.
Shower Bath Cabinet Co.

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Crompton & Knowles Loom Wks.
Draper Corporation.
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Sinkers.
Paulus, Chas. B.

Singeing Machinery.
Butterworth & Sons Co., H. W.
Phila. Drying Machine Co.
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Size Box Temperature Controller.
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Size Kettles.
Butterworth & Sons Co., H. W.
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Sizing and Finishing Compounds.
(See Finishing and Sizing Materials).

Skewers.
Greenville Spool & Mfg. Co.
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Skylights—Steel.
Detroit Steel Products Co.
Dowman, George.
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Slasher Tape.
(See Tape—Slasher).

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Klipstein & Co., A.

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Althouse Chemical Co.
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Kali Mfg. Co.
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Roessler & Hasslacher Chemical Co.
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United Chemical Products Corp.
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Zavon Co., Inc.

Softeners—Water.
(See Water Softeners).

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Westinghouse Elec. & Mfg. Co.

Solvents.
(See Finishing).

Sorting Table Tops.
Pick & Co., Albert.
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Lovingood Co.
Regnas & Co., J. R.
Southern Stamp & Stencil Co.

Stand Pipes.
(See Tanks, Towers, Etc.).

Starch and Gums.
(See Finishing and Sizing Materials).

Steam Engines.
(See Engines—Steam).

Steam Hose.
(Ste Hose—Steam).

Steam Pumps.
(See Pumps—Steam).

Steam Traps.
(See Traps—Steam).

Steel Buildings.
Dowman, George.

Steel Doors, Window, Partition, Etc.).
Detroit Steel Products Co.
Dowman, George.
Lupton's Sons Co., David.

Steel Lockers.
Medart Mfg. Co., Fred.

Stencils and Stencil Papers.
(See Stamps and Stencils).

Stencil Brushes.
(See Marking Pots and Brushes).

Stencil Cutting Machines.
Atlanta Stamp & Stencil Works.
Bradley Mfg. Co., A. J.
Lovingood Co.
Regnas & Co., J. R.
Southern Stamp & Stencil Wks.

Sticks (Picker).
See Picker Sticks.

Stop Motion.
Crompton & Knowles Loom Wks.
Draper Corporation.
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Walraven Co., The.

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BUYERS' INDEX—Continued.

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Walsh & Weidner Boiler Co.

Tapes and Braids.
American Textile Banding Co., Inc.
Barber Mfg. Co.
Knit Goods Specialty Co.
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Tape Looms—Cotton.
Fletcher Works.
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Tape—Slasher.
Lovingood Co.
Regnas & Co., J. R.

Tapes—Spinning and Twisting.
Barber Mfg. Co.
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Tape Making Machines.
(See Bandage and Tape Mach.)

Telephones—Calling System.
Carter Electric Co.
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Temperature Controllers.
Carrier Eng. Corp.
General Electric Co.
Parks-Cramer Co.
Powers Regulator Co.
Sturtevant Co., B. F.
Tagliabue Mfg. Co., C. J.
Taylor Instrument Co.

Temples.
Draper Corporation.

Tenters.
Butterworth & Sons Co., The.
Textile Finishing Mach. Co.

Tenter Frame Guider (Electric).
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Textile Machinery.
(See Cotton Mill Machinery).

Theatre Equipment.
Lucas Theatre Supply Co.
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Tagliabue Mfg. Co., C. J.
Taylor Instrument Co.

Thin Place Preventers.
Draper Corporation.

Thread Guides.
Mitchell-Bissell Co.
Palmer Co., The I. E.

Tiering Machines.
Collins, J. D.
Lovingood Co.
Portable Mchry. Co.
Regnas & Co., J. R.

Ties—Baling.
(See Bale Ties).

Tires—Auto and Truck.
U. S. Rubber Co.

Toilets.
Crane Co.
Dail Steel Products Co.
Manufacturing Equipment & Engineering Co.
Rundle-Spence Mfg. Co.
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Tools—All Kinds.
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National Machine Tool Co.
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Walraven Co., The.

Towers.
(See Tanks and Towers).

Tractors—Electric, Industrial.
Collins, J. D.
Elwell-Parker Elec. Co.
Regnas & Co., J. R.

Transmission—Power.
(See Power Transmission Machinery).

Transfer Points.
Paulus, Chas. B.

Traps—Return Steam.
American Blower Co.
Morehead Mfg. Co.

Trucks—Auto.
Packard Motor Car Co.
White Co., The.

Truck & Wagon Loaders.
Portable Mchry. Co.

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Lane & Bro., W. T.

Trucks—Electric—Inter.
Collins, J. D.
Elwell-Parker Electric Co.
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Trucks—Hand and Elevating.
Collins, J. D.
Elwell-Parker Elec. Co.
Handy Equip. Corp.
Hulme, J. S.
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Regnas & Co., J. R.

Trucks—One Man.
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Trucks—Fibre—Inter, Etc.
Diamond State Fibre Co.
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Tubes—Cloth.
Diamond State Fibre Co.

Turbines—Steam.
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Twisting Machinery and Supplies.
Barber Mfg. Co.
Draper Corporation.
Howard & Bullough.
Knit Goods Specialty Co.
Saco-Lowell Shops.
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Urinals.
Crane Co.
Dail Steel Products Co.
Rundle-Spence Mfg. Co.
Vogel Co., Jos. A.

Unions—Bronze.
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Jenkins Bros.
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Vacuum Cleaning System for Mills.
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Vacuum Pans.
Cresson-Morris Co.

Valves—Angle, Globe, Cross, Blow-off, Check, Gate, Pop-Safety, etc.).
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Graton & Knight Mfg. Co.
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Varnishes.
Barrett Co.
Cooledge & Sons, F. J.
Du Pont de Nemours & Co., E. I.
Hampden Paint & Chem. Co.
Johnson & Co., Inc., Oliver.
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Perkins & Son, Inc., B. F.
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Wash Basins.
(See Lavatories).

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American Laundry Machinery Co.
Butterworth & Sons Co., H. W.
Cocker Mch. & Fdry. Co.
Klauder-Weldon Dyeing Mch. Co.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Textile Finishing Mchry. Co.
Tolhurst Mch. Wks.

Washers.
Diamond State Fibre Co.
Graton & Knight Mfg. Co.

Waste Dealers.
Valley Waste Mills.

Waste Machinery—Cotton.
Howard & Bullough.
Saco-Lowell Shops.
Sargent's Sons Corp., C. G.
Schofield Co., Wm.
Smith & Furbush Mach. Co.
Whitin Machine Co.

Watchman Clocks.
(See Clocks—Watchman).

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Crane Co.
Manufacturing Equipment & Engineering Co.
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American Water Softener Co.
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Permutit Co.
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(See Tanks and Towers).

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Butterworth & Sons Co., H. W.
Textile Finishing Machinery Co., The.

Weaving.
(See Yarn Manufacturers).

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(See Village Architects).

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Hughes Specialty Well Drilling Co.
Robbins, J. E.

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(See Fibre Products).

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Whistles—Steam.
Crane Co.
Lunkenheimer Co.

Whizzers.
Tolhurst Mch. Wks.

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Firsching, J. A.
Howard & Bullough, American Machine Co.
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Smith & Furbush Mach. Co.
Stafford Co., The.
Universal Winding Co.

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Detroit Steel Products Co.
Dowman, George.
Lupton's Sons Co., David.

Wires—Drop.
(See Drop Wires).

Wiring Conduits and Fittings.
See Electric Conduits.

Wiring—Elecrical.
(See Electrical Contractors).

Wood.
(See Lumber).

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(See Pulleys).

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Schofield Co., Wm.
Phila. Drying Machinery Co.
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Sargent's Sons Corp., C. G.
Smith & Furbush Mach. Co.
Stafford Co., The.
Textile Finishing Machinery Co.
Whitin Machine Works.

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Lane Unique Tool Co., Wm. B.

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Arlington Cotton Mills.
Arrow Mills, Inc.
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Florsheim, H. A.
Gray Mfg. Co.
Hunter Mfg. & Comm. Co.
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Parkdale Mills, Inc.
Weimar Bros.

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Advertisers' Index

Aberthaw Construction Co. ... 35
Aldrich Machine Works 270
Allen Spindle Corp. ..... *
Allis-Chalmers Mfg. Co. 274
Althouse Chemical Co. 247
American Audit Co. 291
American Blower Co. ..... *
American Cast Iron Pipe Co...270
American City Engineering Co.306
American Kron Scale Co. 297
American Laundry Mchry. Co. *
American Machine Co. H. & B.279
American Mutual Liability Insurance Co. 282
American Processing Co. 254
American Scrubbing Equipment Co. 21
American Supply Co. 260
American Textile Banking Co., Inc. 326
American Water Softener Co..242
Anchor Post Iron Works 286
Arabol Mfg. Co. 297
Arex Co. 33
Arkray Mills, Inc. 277
Arlington Cotton Mills 277
Arnold, Hoffman & Co. 250
Arrow Mills, Inc. 277
Atlanta Brush Co. 298
Atlanta National Bank 281
Atlantic Dyestuff Co. 248
Atlanta Rubber Stamp & Stencil Works 295
Atlanta & West Point Ry. ...280
Atlas Electric Devices Co. ... *
Augusta Mill Supply Co. 297
Autogenous Welding Co. 272

Barber-Colman Co. 295
Barber Mfg. Co. 293
Barrett Co., The 277
Beer, H. & B. 278
Benjamin Electric Co. ..... *
Birmingham Slag Co. 42
Blake Electric Mfg. Co. 257
Borne, Scrymser Co. 250
Borromite Co. of America 247
Bosson & Lane 254
Bradley Mfg. Co., A. J. 324
Brinton Co., H. 322
Brunswick-Balke Collender Co. 19
Butterworth & Sons Co., H. W.241

Campbell Mfg. Co. 285
Carlisle & Gale Co. 269
Carlyle-Johnson Machine Co...270
Carrier Engineering Corp. ...291
Carter Electric Co. 274
Carver-Beaver Yarn Co. 324
Chattanooga Queensware Co. .. *
Chicago Pulley & Shafting Co.. *
Chicago Watchman's Clocks works 306
Citizens & Southern Bank 278
Classified Opportunities 282
Cocker Machine & Foundry Co.242
Cokal Stoker Co. 293
Collins, J. D. 268
Commercial Acetylene Supply Co. 304
Coolidge & Sons, F. J. 270
Cooper Hewitt Electric Co ... *
Corn Products Refining Co. ...255
Cortright Metal Roofing Co. ...329
Crane Co. 32
Cresson-Morris Co. 271
Crompton & Knowles Loom Works 14
Crouse-Hinds Co. 47
Curtis Pneumatic Mchry. Co... *
Cutter Works, George 44
Cutts Co., E. A. 276
Cyclone Fence Co. 299

Dail Steel Products Co. ..... *
Davis, Roger W. 14
Detroit Steel Products Co. ... 39
Detroit Stoker Co. 273
Diamond State Fibre Co. 261
Dixie Electric Equipment Co..275
Dixon Crucible Co., Joseph ...308
Dodge Sales & Eng'g Corp. ..300
Dowman, George ..... *
Draper Corporation 3
Dufur & Co. 276
Du Pont de Nemours & Co., E. I. 249

Eco Clock Co. 258
Economy Baler Co. 293
Economy Fuse & Mfg. Co. ... *
Edison Storage Battery Co. ... *
Electric Smelting & Aluminum Co. 326
Electro Bleaching Gas Co. ...329
Elwell-Parker Electric Co. ... *
Emmons Loom Harness Co. ...291
Erdle Perforating Co. 291
Ernst & Ernst 290

Fafnir Bearing Co. 300
Fawcett, Hughes 278
Ferguson Co., John W. 41
Firsching Co., J. A. 326
Flexible Steel Lacing Co. 271
Fletcher Works 7
Flint Mfg. Co. 277
Florsheim, H. A. 277
Fonda Organization, The E. A.. 13
Foundation Co., The 284

Galland-Henning Mfg. Co. ...304
Garland Mfg. Co. 308
General Electric Co. ..... *
General Machine Works 326
Goode, R. L. 276
Grasselli Chemical Co. 252
Graton & Knight Mfg. Co. ...297
Gray Mfg. Co. 277
Greb Co. 289
Gregory & Gregory, Walter ..324
Greenville Spool Mfg. Co. ...258
Greist Mfg. Co. 17
Gude & Co. 276
Gulf States Creosoting Co. ...268

Hackney Bros. 276
Hampden Paint & Chem. Co...266
Handy Equipment Co. ..... *
Hemphill Mfg. Co. 312
Hightower Box & Tank Co...264
Hill Standard Co. 262
Hotel Sinton 275
Howard & Bullough Mach. Co...279
Hughes Specialty Well Drilling Co. 276
Hulme, J. S. 306
Hunter Mfg. & Comm. Co. ... *
Huntington & Guerry, Inc. ... 46
Hyatt Roller Bearing Co. ....4, 5, 8 and 9

Ideal Lawn Mower Co. ..... *
International Eng'g Works ... 50
Irving National Bank 293
Iselin & Co., Wm. 324

Jenkins Bros. 271
Jones Machinery Corp. 291
Johnson & Co., Inc., Oliver... 42
Jordan Mfg. Co. 306

Kali Mfg. Co. 248
Kaumagraph Co. 308
Keever Starch Co. 250
Keystone Fibre Co. 258
King, Jr., Habersham 324
Kirkpatrick Lumber & Timber Co. 293
Klauder-Weldon Dyeing Mach. Co. 246
Klipstein & Co., A. 248
Knit Goods Specialty Co. 304

Ladew Co., Edw. R. 289
Lane & Bro., W. T. 259
Lane Unique Tool Co., Will B..272
Lewis, John D. 324
Link-Belt Co. 24
Lockwood, Greene & Co. 266
Lombard Iron Works 291
Lovingood Co., The 306
Lowell Crayon Co. 329
Lunkenheimer Co. 15
Lupton's Sons Co., David 37

Manufacturing Equipment & Engineering Co. 262
Marshall Co., H. Newton 269
Mason Machine Works 16
Medart Mfg. Co., Fred 297
Merrow Machine Co. 320
Metz Co., H. A. 251
Millers Indemnity Underwriters 296
Mitchell-Bissell Co. 2
Monroe Calculating Mch. Co...261
Moore Oil & Refining Co. .... *
Morehead Mfg. Co. 273
Morse Chain Co 26
Mossberg Co., Frank ..... *
Myrtle Mills, Inc. 277

Nashville Industrial Corp. 282
National Aniline & Chemical Co. 1
National Asso. Hosiery & Underwear Mfgrs. 320
National Bank of Commerce In New York 289
National Machine Tool Co. ...269
National Metal Molding Co. ..275
National Shawmut Bank 279
New York & N. J. Lub. Co. ... 29
Newport Chemical Co. 294

Packard Motor Car Co. 23
Palmer Co., E. I. 262
Parks-Cramer Co. 10
Patterson Sargent Co. 48
Paulus, Chas. B. 322
Parkdale Mills, Inc. 277
Pearson, Jos. T. 326
Peaslee-Gaulbert Co. ..... *
Perkins & Son, Inc., B. F. ...259
Permutit Co. 245
Phila. Textile Mchry. Co. 247
Phila. Drying Mchry. Co. 298
Pick & Co., Albert ..... *
Portable Machinery Co. 293
Powers Regulator Co. 244
Precision Machine Co. 258
Proctor & Schwartz, Inc. 247
Pure Sanitary Drinking Fountain Co. 265

Refinite Co., The ..... *
Regnas, J. R. 263
Reichmann Co. 289
Reliance Machine Works 322
Richards-Wilcox Mfg. Co. 265
Robbins & Sons 276
Robert & Co. 42
Roessler & Hasslacher Chemical Co. 302
Rogers Fibre Co. 256
Rome Mch. & Fdry. Co. 329
Roy & Sons Co., B. S. 16
Rundle-Spence Mfg. Co. 265
Russell Mfg. Co. 294

Saco-Lowell Shops 14
Salem Iron Works 329
Sanitas Co. 287
Sargent's Sons Corp., C. G. ..244
Scaife & Sons, Wm. B. 295
Schaum & Uhlinger 7
Schofield Sons Co., J. S. 272
Schofield Co., Wm. 295
Scott & Co., Henry L. 296
Scott & Williams 311
Seawell, Luke 33
Seeger Machine Tool Co. ..... *
Shambow Shuttle Co. 308
Sherman Service, Inc. 6
Sherwood Mfg. Co. 31
Shower Bath Cabinet Co .... *
Signode System, Inc. 264
Sirrine, J. E. 38
S K F Industries, Inc. 27
Smith & Furbush Machine Co...264
Slaughter Mchry. Co., G. G...297
Sonneborn Sons, Inc., L. ..... *
Southern Bending Co. 18
Southern Brush & Broom Co...260
Southern Cotton Oil Co. 269
Southern Cotton Yarn Co. 277
Southern Cypress Mfg. Asso... 36
Southern Distributing Co. 254
Southern Railway System ... *
Southern Spindle & Flyer Co...260
Southern Stamp & Stencil Co...276
Southern States Supply Co. .. *
Southern Theatre Equip. Co... 20
Southern Welding & Mach. Co.276
Spiker & Lose 291
Stafford Co., The ..... *
Standard Conveyor Co. ..... *
Standard Fibre Co. 285
Standard Gas Products Co. ...272
Standard Pressed Steel Co. .... *
Steel Heddle Mfg. Co. 260
Stieff, Inc., Chas. 262
Sturtevant Co., B. F. 12
Surpass Chemical Co. 252
Swan & Finch 298

Tagliabue Mfg. Co., C. J. 246
Taylor Instrument Co. 297
Terrell Machine Co. 300
Texas Co. 30
Textile Banking Co. 289
Textile Finishing Mchry. Co. ..298
Thomas Co., F. H. 263
Thompson & Binger, Inc. 267
Tolhurst Machine Co. 243
Toomey, Frank, Inc. 282
Torsion Balance Co. 264
Tropical Paint & Oil Co. 40
Tufts Co., Arthur 280
Tuxbury Lumber Co., A. C. ... 34

United Chemical Products Co...287
United Electric Co. ..... *
Universal Winding Co. 295
Upchurch, C. L. 282
U. S. Ball Bearing Co. 28
U. S. Fuel Corp. 295
U. S. Rubber Co. ..... *

Valley Waste Mills ..... *
Vogel Co., Jos. A. 268

Wadsworth, Howland & Co., Inc. 267
Walke Box Co., Inc. 324
Wall & Son, C. M. 324
Walraven Co., The 257
Walsh & Weidner Boiler Co. ..298
Want Ads 282
Warren Soap Mfg. Co. 289
Weimar Bros. 277
Westinghouse Electric & Mfg. Co. .....11 and 44
Westinghouse Lamp Co. 45
Whitinsville Spinning Ring Co.256
White Co. ..... *
Whitin Machine Works 18
Whiton Machine Co., D. E. ..270
Wildman Mfg. Co 316
Williams & Sons, I. B. 25
Wolf & Co., Jacques 252
Woodward, Baldwin & Co. ...278
Wright Co. ..... *

Zavon Co., Inc. 253

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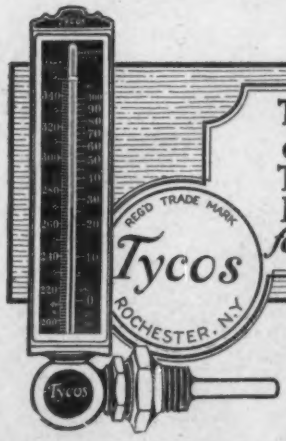

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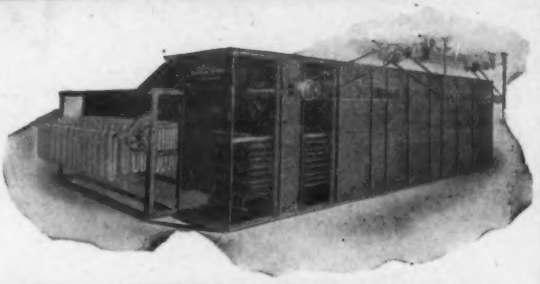

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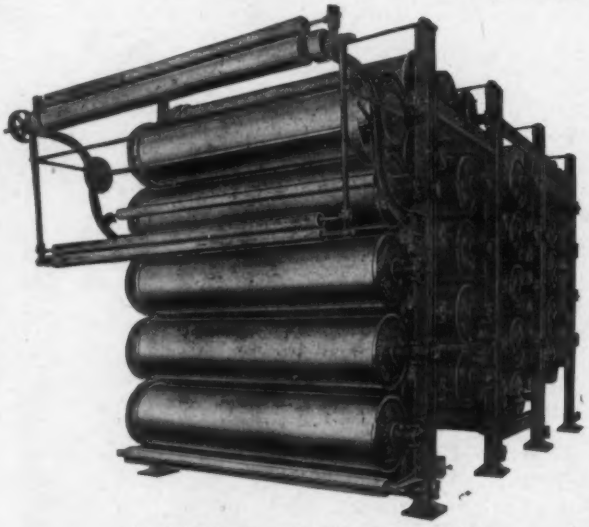

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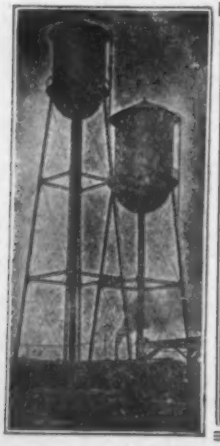

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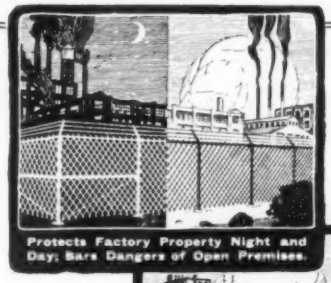

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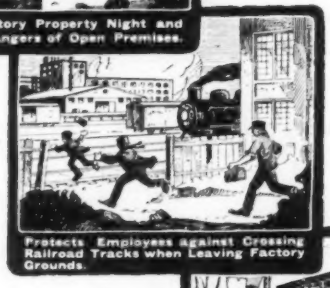

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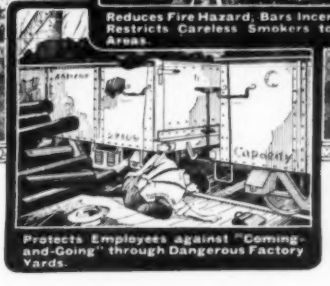

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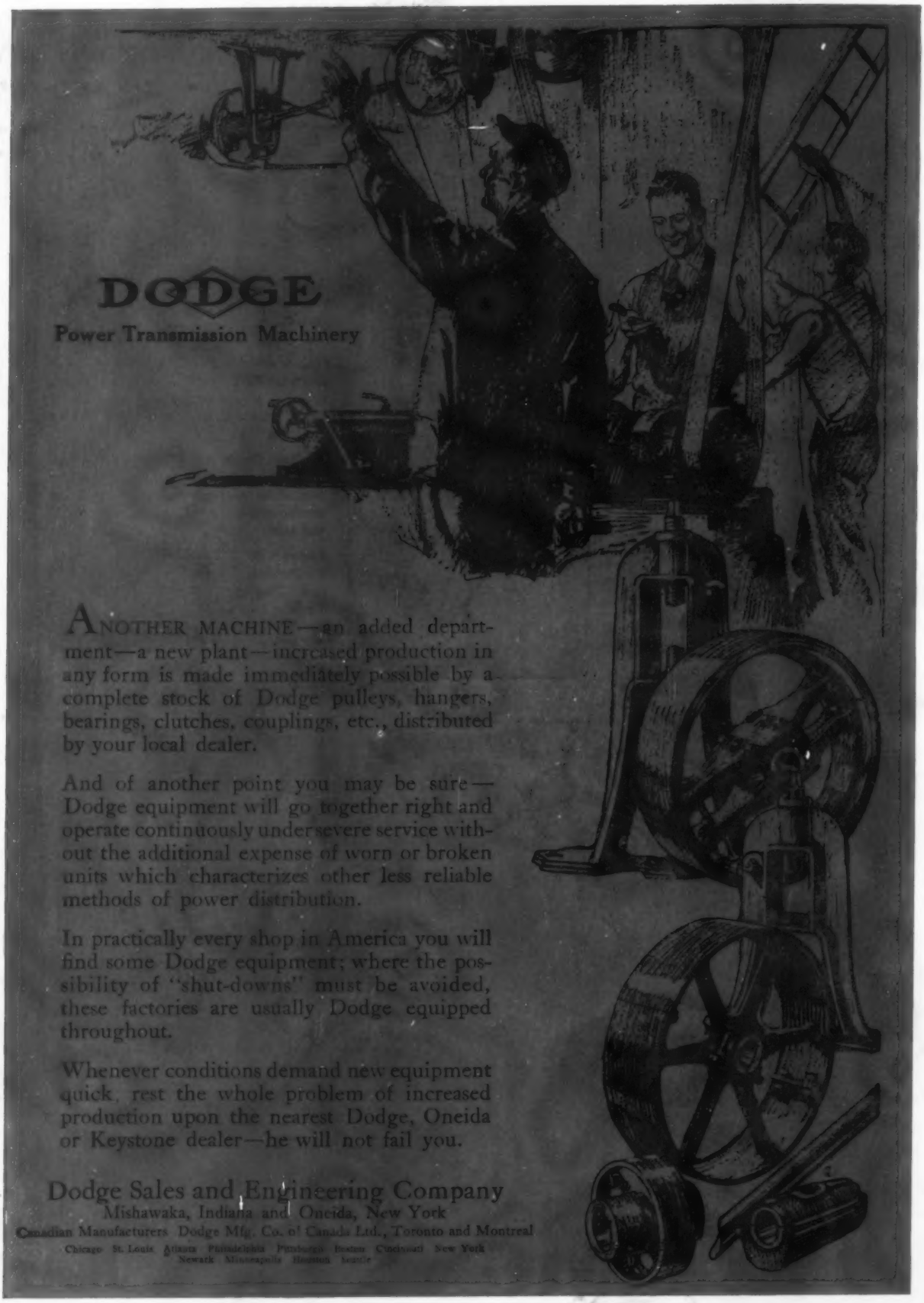

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